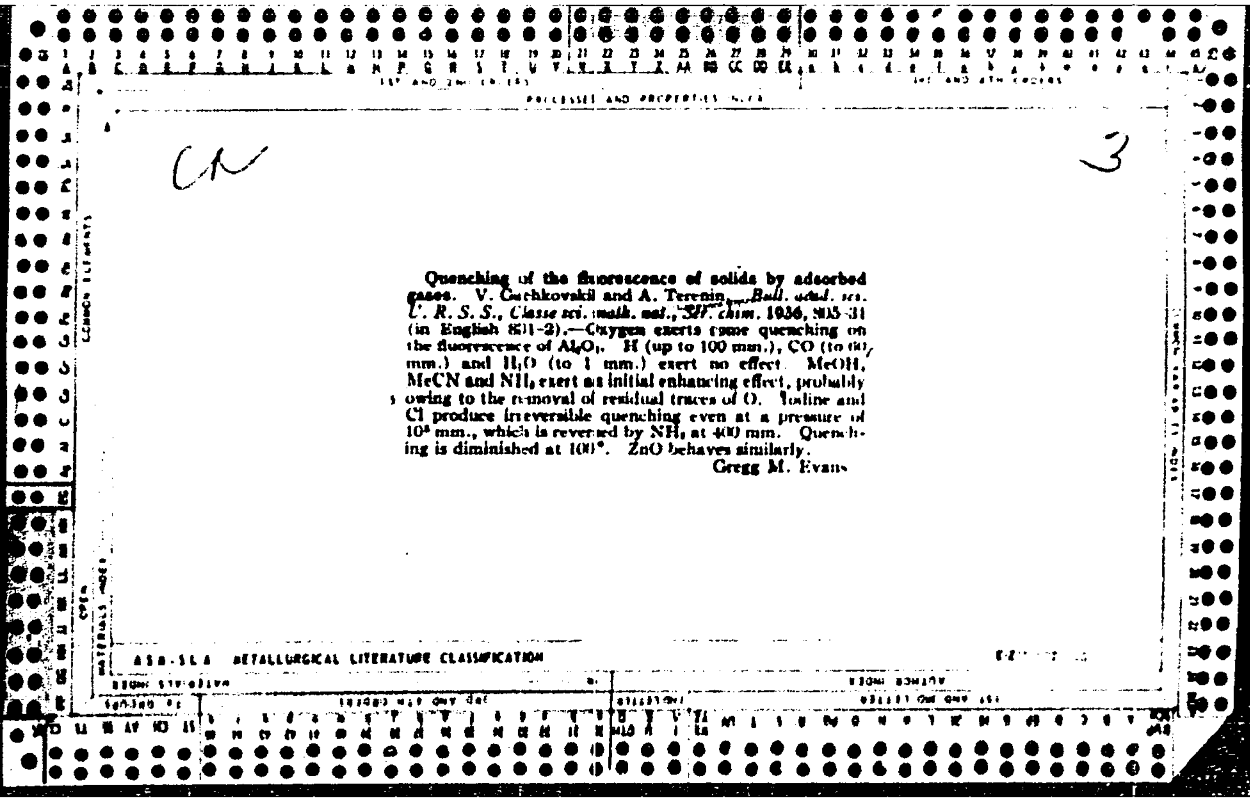


PROCESSES AND PROPERTIES INDEX

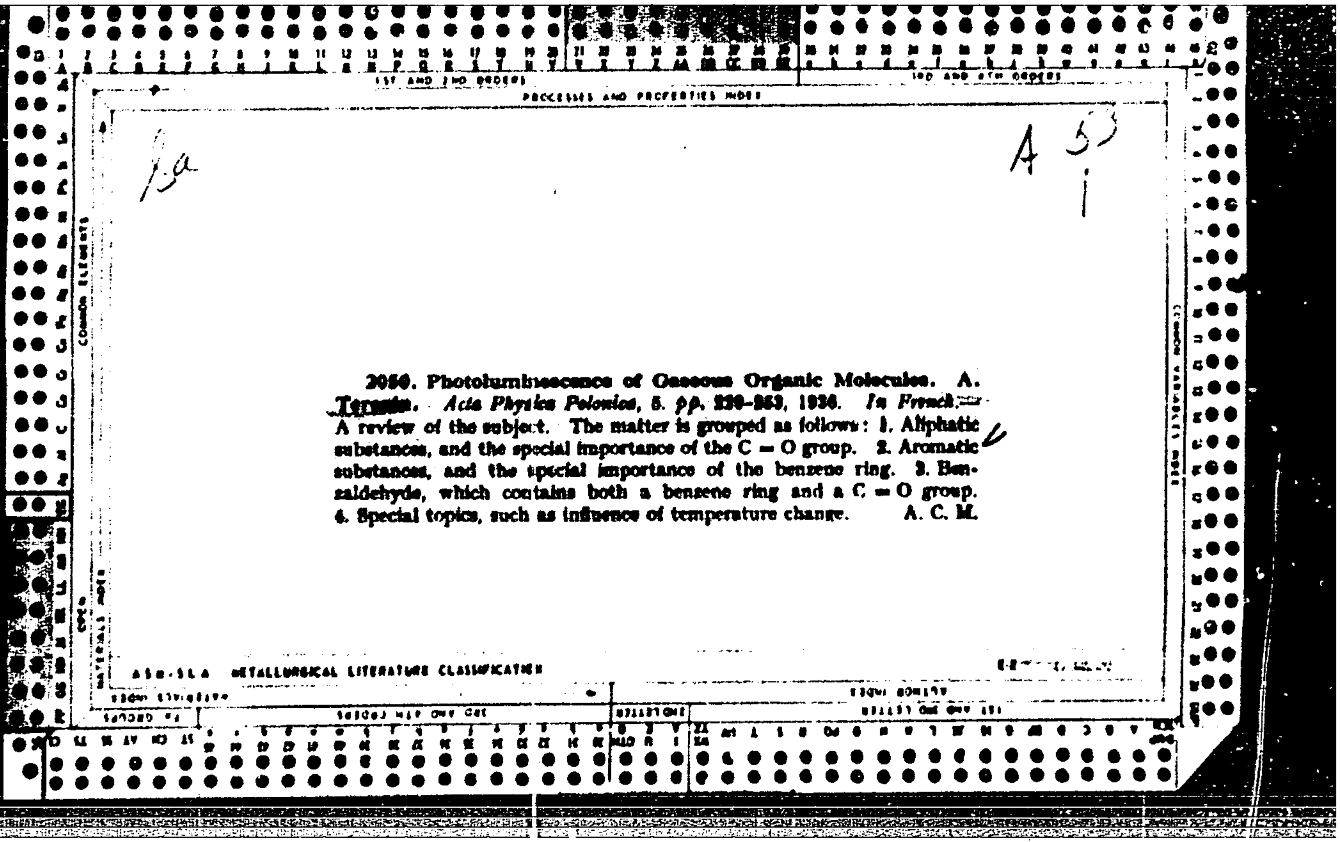
CN

3

Quenching of the fluorescence of solids by adsorbed gases. V. Gachkovskii and A. Terenin. *Bull. acad. sci. U. R. S. S., Classe sci. math. nat., Sér. chim.* **1936**, 805-31 (in English 831-2).—Oxygen exerts some quenching on the fluorescence of Al_2O_3. H (up to 100 mm.), CO (to 60 mm.) and H_2O (to 1 mm.) exert no effect. MeOH, MeCN and NH_3 exert an initial enhancing effect, probably owing to the removal of residual traces of O. Iodine and Cl produce irreversible quenching even at a pressure of 10^{4} mm., which is reversed by NH_3 at 400 mm. Quenching is diminished at 100°. ZnO behaves similarly.

Gregg M. Evans

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

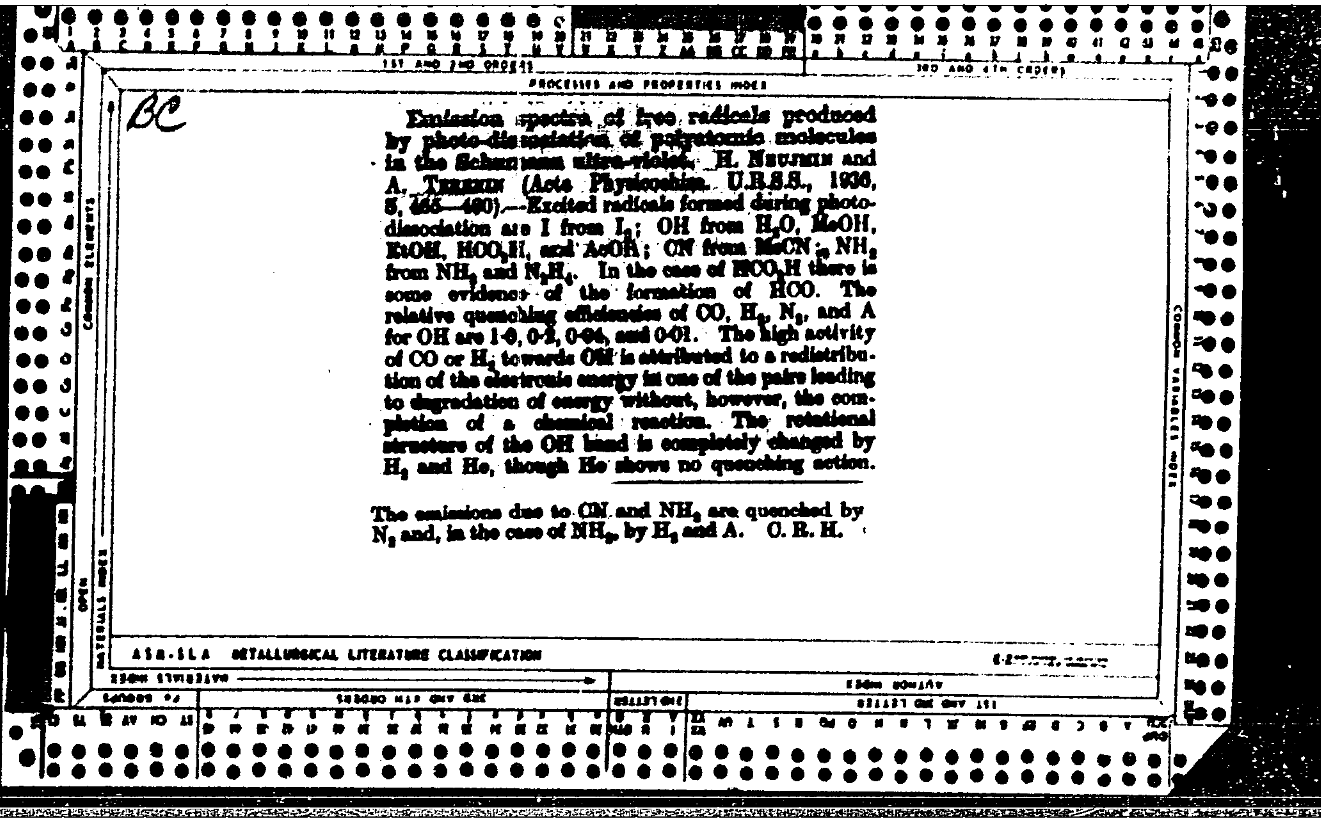
3RD AND 4TH ORDERS

1a

A 53
1

2050. Photoluminescence of Gaseous Organic Molecules. A. Terenin. *Acta Physica Polonica*, 5, pp. 229-253, 1936. *In French.*—A review of the subject. The matter is grouped as follows: 1. Aliphatic substances, and the special importance of the C = O group. 2. Aromatic substances, and the special importance of the benzene ring. 3. Benzaldehyde, which contains both a benzene ring and a C = O group. 4. Special topics, such as influence of temperature change. A. C. M.

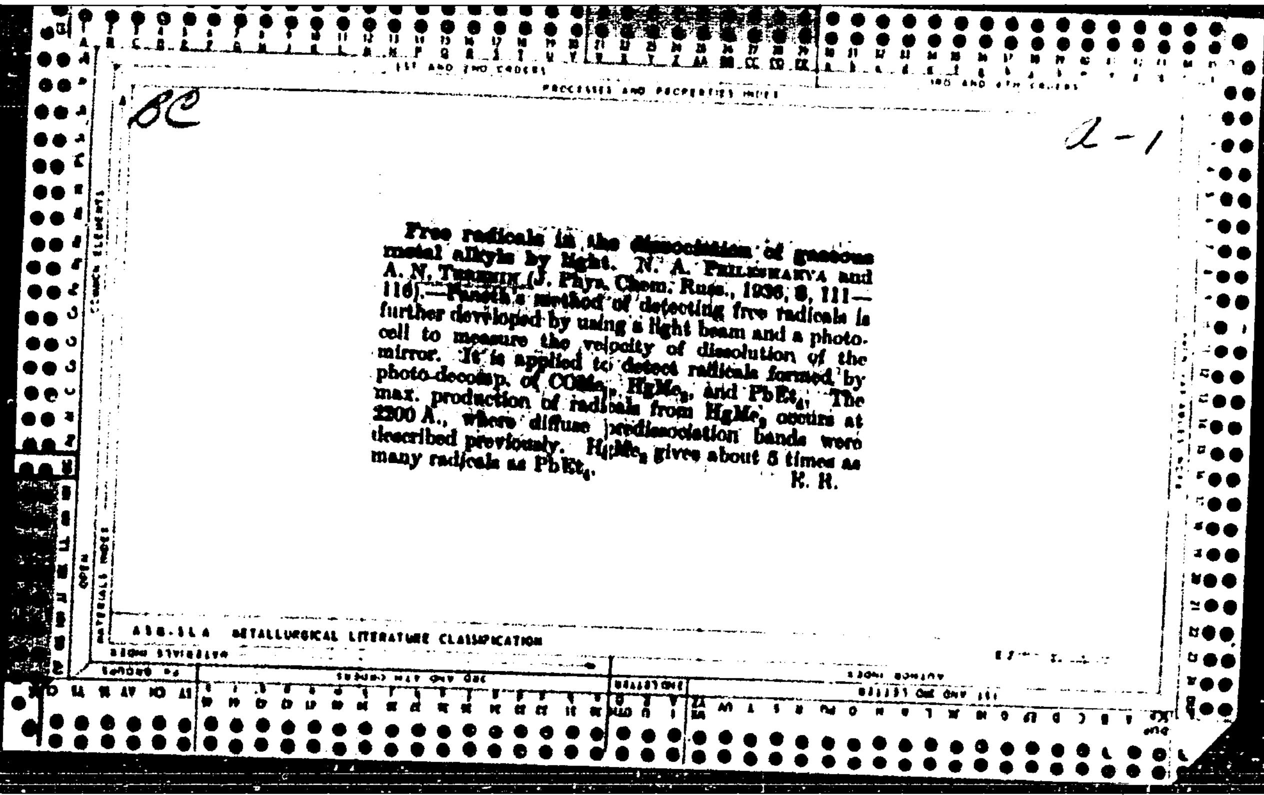
ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



BC

Emission spectra of free radicals produced by photo-dissociation of polyatomic molecules in the Schumann ultra-violet. H. Neujmin and A. Terenin (Acta Physicochim. U.R.S.S., 1936, 5, 465—490).—Excited radicals formed during photo-dissociation are I from I_2; OH from H_2O, MeOH, EtOH, HCO_2H, and AcOH; CN from MeCN; NH_2 from NH_3 and N_2H_4. In the case of HCO_2H there is some evidence of the formation of HCO. The relative quenching efficiencies of CO, H_2, N_2, and A for OH are 1·0, 0·2, 0·04, and 0·01. The high activity of CO or H_2 towards OH is attributed to a redistribution of the electronic energy in one of the pairs leading to degradation of energy without, however, the completion of a chemical reaction. The rotational structure of the OH band is completely changed by H_2 and He, though He shows no quenching action.

The emissions due to CN and NH_2 are quenched by N_2 and, in the case of NH_2, by H_2 and A. O. R. H.



PROCESSES AND PROPERTIES INDEX

8C

2-1

Free radicals in the dissociation of gaseous metal alkyls by light. N. A. PRILESHAEVA and A. N. TERENIN (J. Phys. Chem. Russ., 1936, 8, 111—116).—Paneth's method of detecting free radicals is further developed by using a light beam and a photo-cell to measure the velocity of dissolution of the mirror. It is applied to detect radicals formed by photo-decomp. of $COMe_2$, $HgMe_2$, and $PbEt_4$. The max. production of radicals from $HgMe_2$ occurs at 2300 A., where diffuse predissociation bands were described previously. $HgMe_2$ gives about 5 times as many radicals as $PbEt_4$.

K. R.

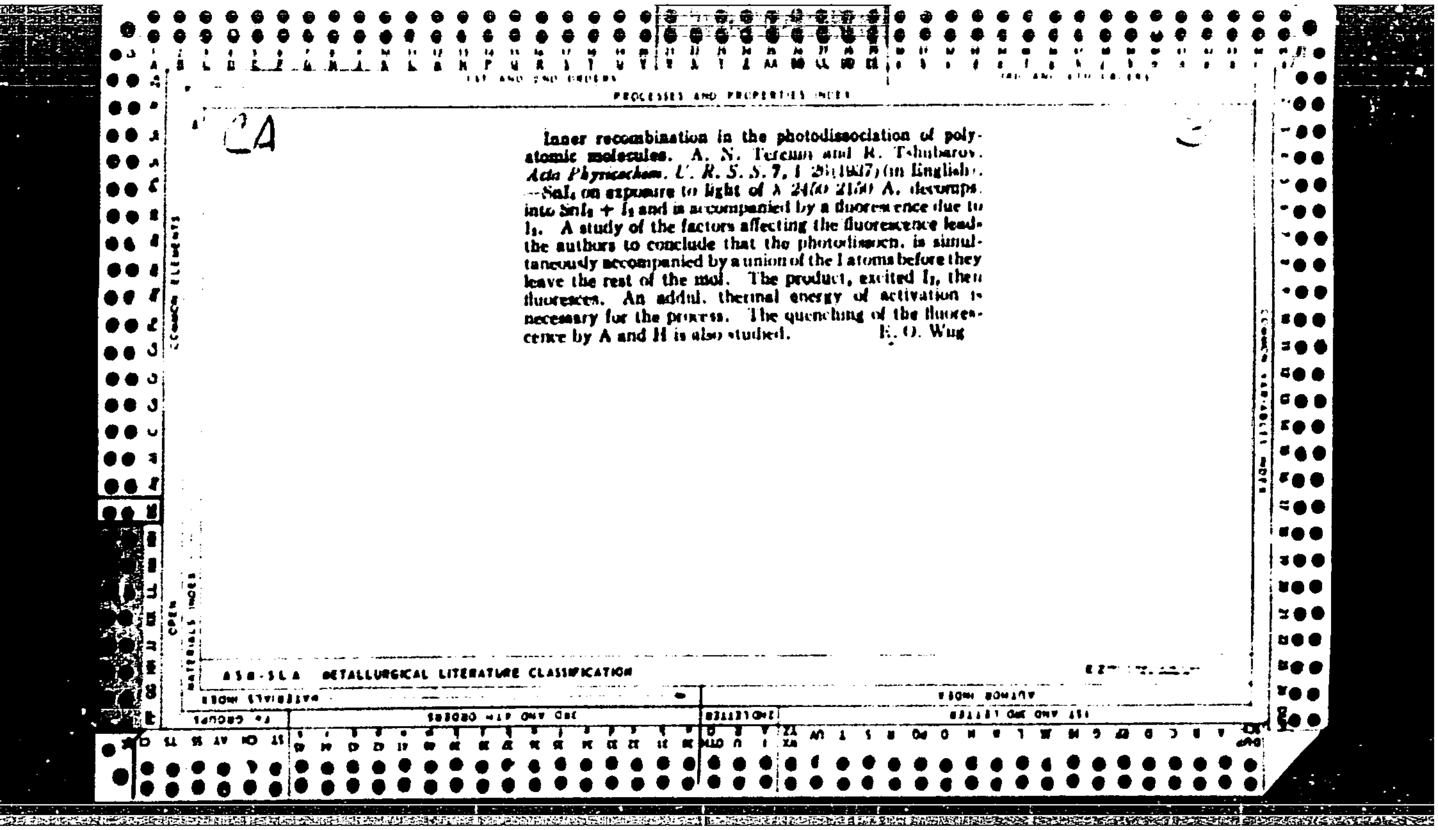
ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

Optical investigation of the adsorption of molecules. A. Terenin. *Uchenye Zapiski Leningrad. Gosudarst. Univ.* 3, No. 17, 149-68(1937).—A summary of adsorption processes taking place in atoms and in mols. including processes caused by light in the adsorbed atoms and mols., the absorption of light by the adsorbed mols., the fluorescence of the adsorbed mols., the sepn. of adsorbed mols. under the action of light and the detn. of adsorption from the change of optical properties of the adsorbent. The optical method opens a new field of possibilities for the investigation of adsorbed mols. Factors established in this article are of a great importance for the little investigated region of heterogeneous chem. reactions.

W. R. Henn

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



PROCESSES AND PROPERTIES INDEX

CA

Inner recombination in the photodissociation of polyatomic molecules. A. N. Terenin and R. Tchubarov. *Acta Physicochim. U. R. S. S.* 7, 1-26(1937)(in English). —SnI_4 on exposure to light of λ 2400-2100 A. decomps. into $SnI_2 + I_2$ and is accompanied by a fluorescence due to I_2. A study of the factors affecting the fluorescence leads the authors to conclude that the photodissocn. is simultaneously accompanied by a union of the I atoms before they leave the rest of the mol. The product, excited I_2, then fluoresces. An addnl. thermal energy of activation is necessary for the process. The quenching of the fluorescence by A and H is also studied. E. O. Wiig

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

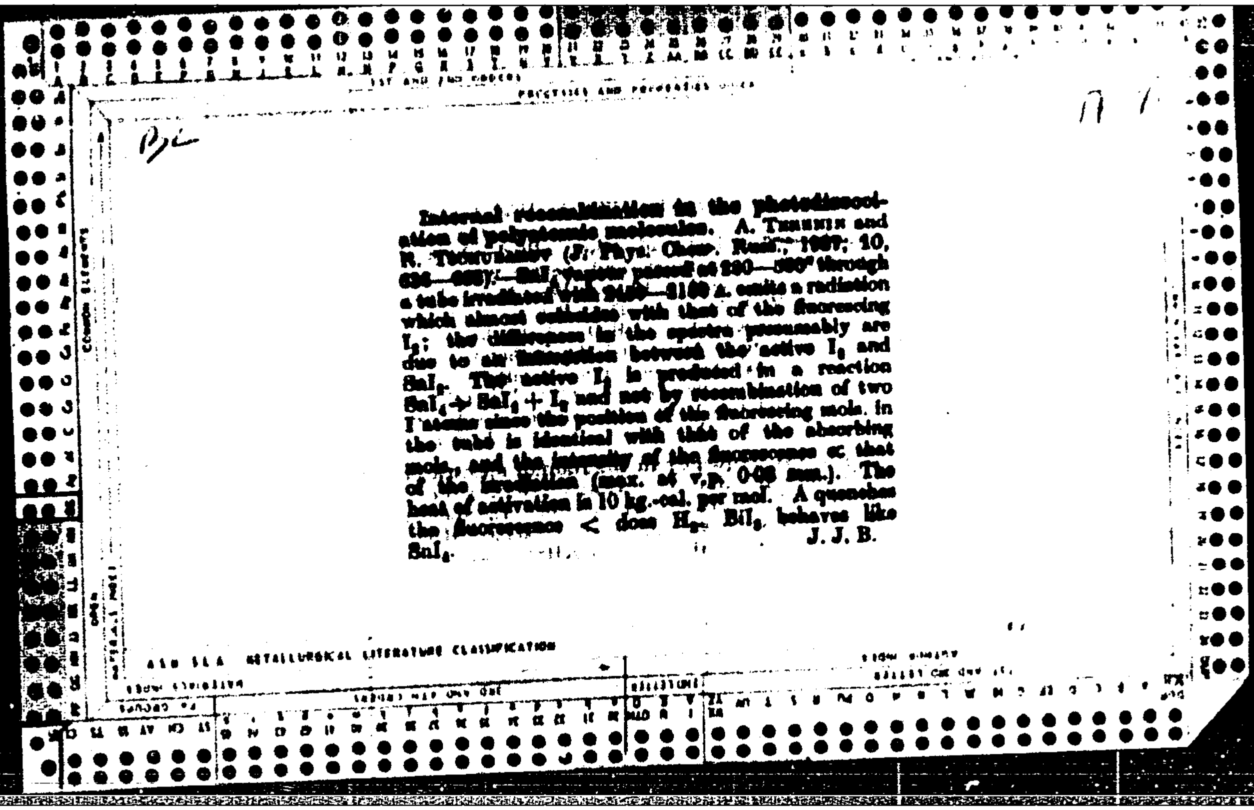
3RD AND 4TH ORDERS

14

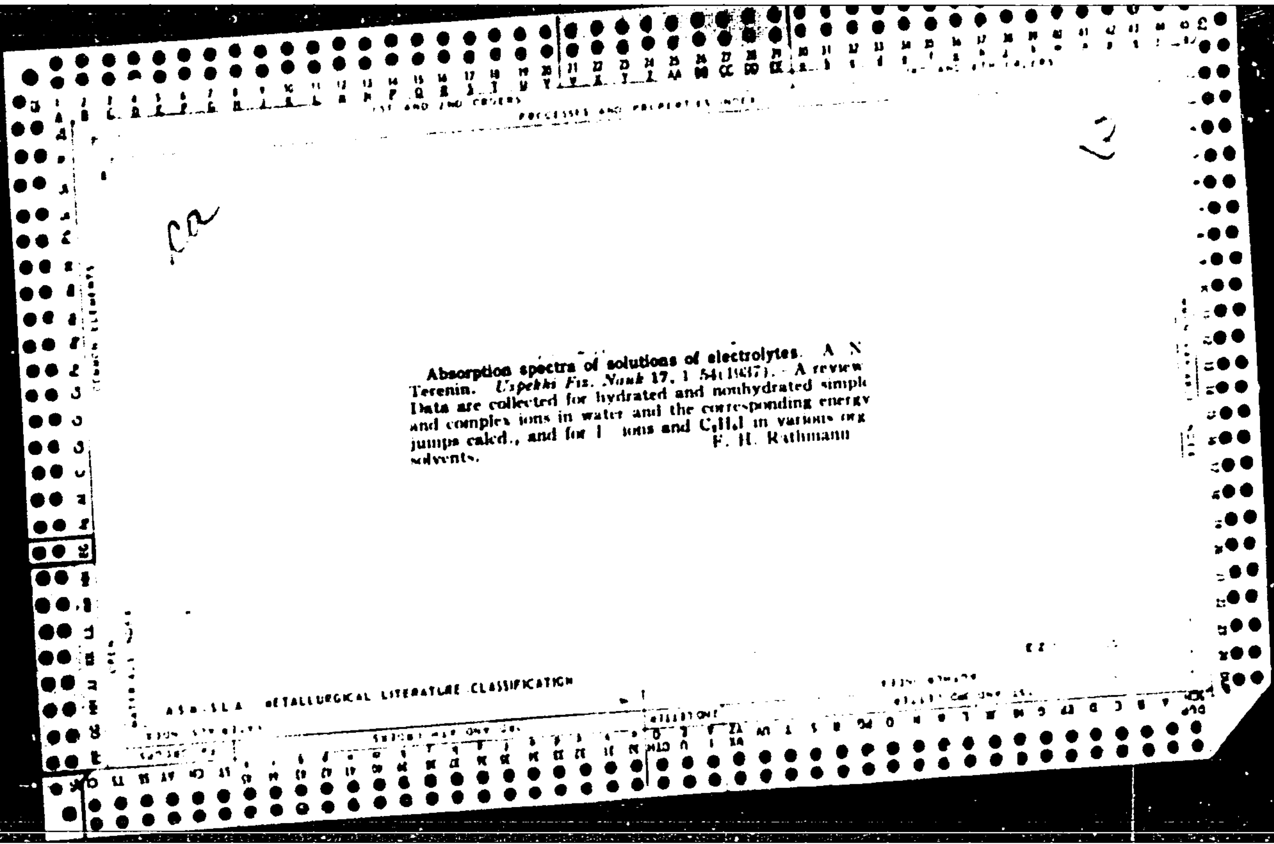
3

Quenching of the fluorescence of solids by adsorbed gases. V. Vlachkovskii and A. Terenin. *Acta Physicochim. U. R. S. S.* 7, 521-30(1937) (in English).—See C. A. 31, 8276⁶. F. H.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



Internal recombination in the photodissociation of polyatomic molecules. A. Terenin and R. Tchubarov (J. Phys. Chem. Russ., 1937, 10, 634—639).—SnI_4 vapour passed at 200—300° through a tube irradiated with 2400—3100 A. emits a radiation which almost coincides with that of the fluorescing I_2; the differences in the spectra presumably are due to an interaction between the active I_2 and SnI_2. The active I_2 is produced in a reaction $SnI_4 \rightarrow SnI_2 + I_2$ and not by recombination of two I atoms since the position of the fluorescing mols. in the tube is identical with that of the absorbing mols., and the intensity of the fluorescence ∝ that of the irradiation (max. at v.p. 0·08 mm.). The heat of activation is 10 kg.-cal. per mol. A quenches the fluorescence < does H_2. BiI_3 behaves like SnI_4. J. J. B.



CR

2

Absorption spectra of solutions of electrolytes. A. N. Terenin. *Uspekhi Fiz. Nauk* 17, 1-54(1937).—A review. Data are collected for hydrated and nonhydrated simple and complex ions in water and the corresponding energy jumps calcd., and for I ions and C_6H_5I in various org. solvents.

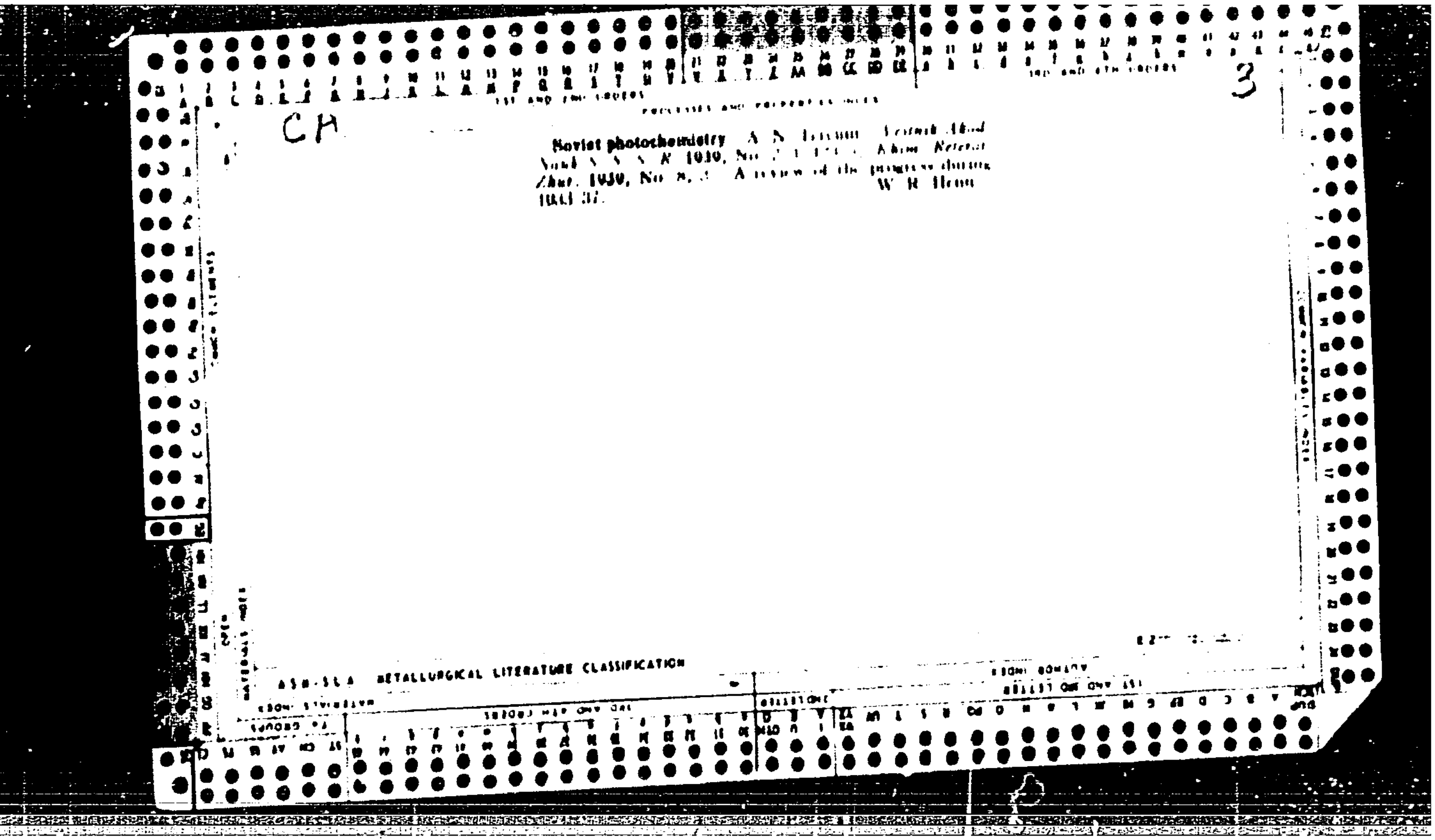
F. H. Rathmann

CA

5

Optical methods in organic chemistry. A. N. Terenin.
Trudy Sessii Akad. Nauk Org. Khim. 1939, 281-8.—Opti
cal methods in org. chemistry serve for the detn. of the
structure of the mol. and for the study of the mechanism
of reactions. A recent development is the study of photo-
chem. dissocn. or cracking reactions under the action of
ultraviolet light. The main difficulty is the extremely low
concn. of free radicals, for which the usual Paneth method
(cf. C. A. 29, 3301⁹) is not sensitive enough. Better re-
sults were obtained by the use of a photoelec. device. In
the dissocn. of hydrocarbons in vapor phase under ultra
violet irradiation, free hydroxyl, amino, etc., radicals were
measured in concns. as low as 10^8 to 10^{14} particles per cc.
Direct optical analysis of reactions is as yet in the tentative
stage. Bruno C. Metzner

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

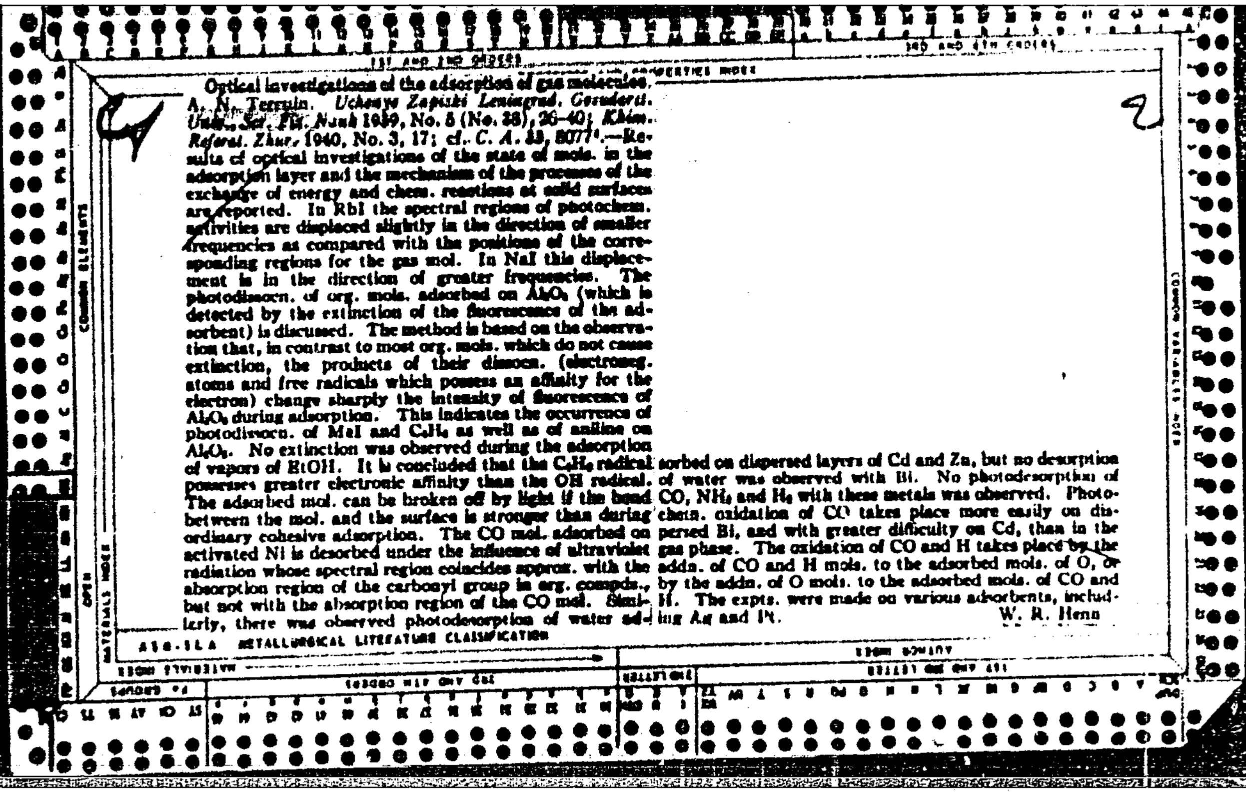


CH

3

Soviet photochemistry. A. N. Terenin. Vestnik Akad. Nauk S.S.S.R. 1939, No. [illegible]; Khim. Referat. Zhur. 1939, No. 8, [illegible]. A review of the progress during 1933-37. W. R. Henn

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



2

Optical investigations of the adsorption of gas molecules. A. N. Terenin. *Uchenye Zapiski Leningrad. Gosudarst. Univ., Ser. Fiz. Nauk* 1939, No. 5 (No. 38), 26-40; *Khim. Referat. Zhur.* 1940, No. 3, 17; cf. *C. A.* 33, 8077^4.—Results of optical investigations of the state of mols. in the adsorption layer and the mechanism of the processes of the exchange of energy and chem. reactions at solid surfaces are reported. In RbI the spectral regions of photochem. activities are displaced slightly in the direction of smaller frequencies as compared with the positions of the corresponding regions for the gas mol. In NaI this displacement is in the direction of greater frequencies. The photodissocn. of org. mols. adsorbed on Al_2O_3 (which is detected by the extinction of the fluorescence of the adsorbent) is discussed. The method is based on the observation that, in contrast to most org. mols. which do not cause extinction, the products of their dissocn. (electroneg. atoms and free radicals which possess an affinity for the electron) change sharply the intensity of fluorescence of Al_2O_3 during adsorption. This indicates the occurrence of photodissocn. of MeI and C_6H_6 as well as of aniline on Al_2O_3. No extinction was observed during the adsorption of vapors of EtOH. It is concluded that the C_6H_5 radical possesses greater electronic affinity than the OH radical. The adsorbed mol. can be broken off by light if the bond between the mol. and the surface is stronger than during ordinary cohesive adsorption. The CO mol. adsorbed on activated Ni is desorbed under the influence of ultraviolet radiation whose spectral region coincides approx. with the absorption region of the carbonyl group in org. compds., but not with the absorption region of the CO mol. Similarly, there was observed photodesorption of water adsorbed on dispersed layers of Cd and Zn, but no desorption of water was observed with Bi. No photodesorption of CO, NH_3 and H_2 with these metals was observed. Photochem. oxidation of CO takes place more easily on dispersed Bi, and with greater difficulty on Cd, than in the gas phase. The oxidation of CO and H takes place by the addn. of CO and H mols. to the adsorbed mols. of O, or by the addn. of O mols. to the adsorbed mols. of CO and H. The expts. were made on various adsorbents, including Ag and Pt.

W. R. Henn

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

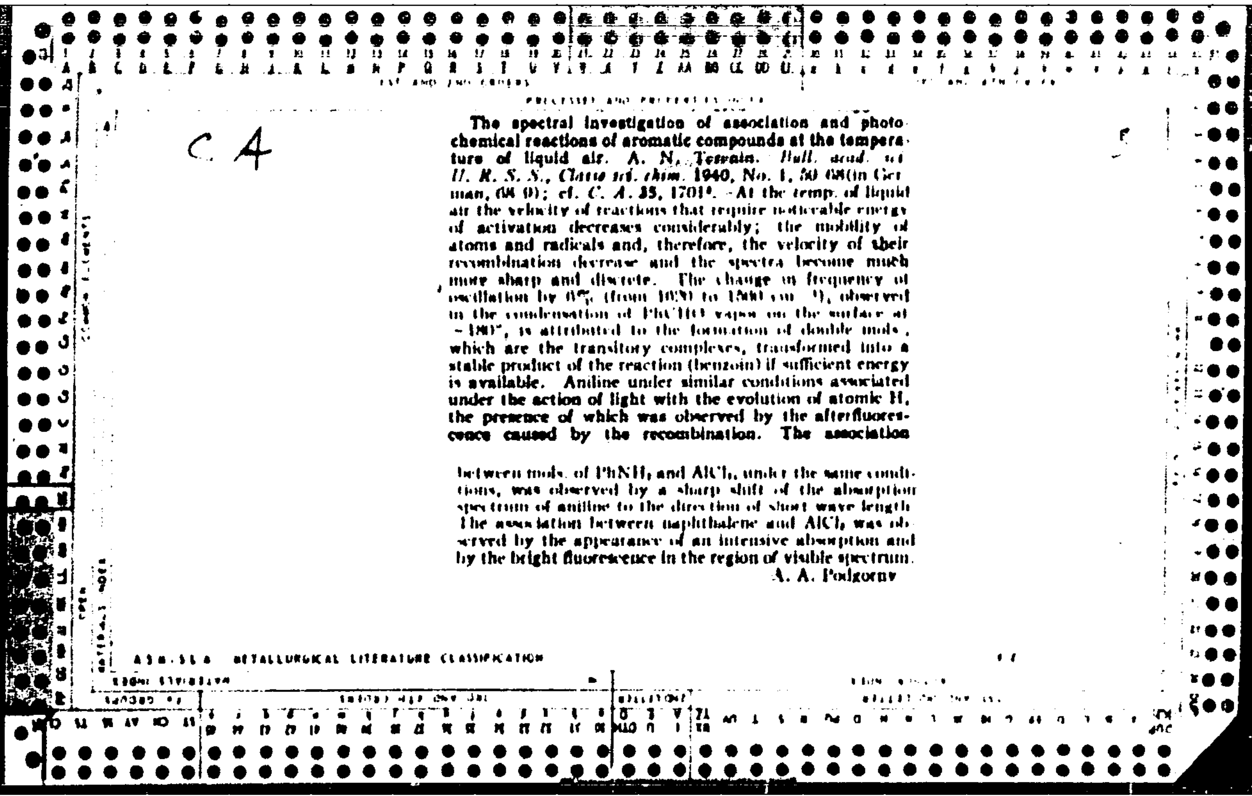
Ca

25

The problems of fading. A. N. Terenin. *Trudy Chetvertogo Soveshchaniya Voprosam Anilinokrasochnoi Khim. i Tekhniki* 1940, 63–71; *Khim. Referat. Zhur.* 4, No. 6, 16(1941).—Precision physical methods are necessary for the complete explanation of the individual stages of the fading process. In a no. of cases the application of the photochem. method explained the individual steps of the fading process. Fading is not a chain reaction; the retardation of fading by inhibitors is caused by the decompn. of the peroxide compd. formed by the dye.

W. R. Henn

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



CA

The spectral investigation of association and photochemical reactions of aromatic compounds at the temperature of liquid air. A. N. Terenin. *Bull. acad. sci. U. R. S. S., Classe sci. chim.* 1940, No. 1, 50-68(in German, 68-9); cf. *C. A.* 35, 1701^9.—At the *temp.* of liquid air the velocity of reactions that require noticeable energy of activation decreases considerably; the mobility of atoms and radicals and, therefore, the velocity of their recombination decrease and the spectra become much more sharp and discrete. The change in frequency of oscillation by 6% (from 1650 to 1500 cm.$^{-1}$), observed in the condensation of PhCHO vapor on the surface at −180°, is attributed to the formation of double mols., which are the transitory complexes, transformed into a stable product of the reaction (benzoin) if sufficient energy is available. Aniline under similar conditions associated under the action of light with the evolution of atomic H, the presence of which was observed by the afterfluorescence caused by the recombination. The association between mols. of $PhNH_2$ and $AlCl_3$, under the same conditions, was observed by a sharp shift of the absorption spectrum of aniline to the direction of short wave length. The association between naphthalene and $AlCl_3$ was observed by the appearance of an intensive absorption and by the bright fluorescence in the region of visible spectrum.

A. A. Podgorny

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

C 4

3

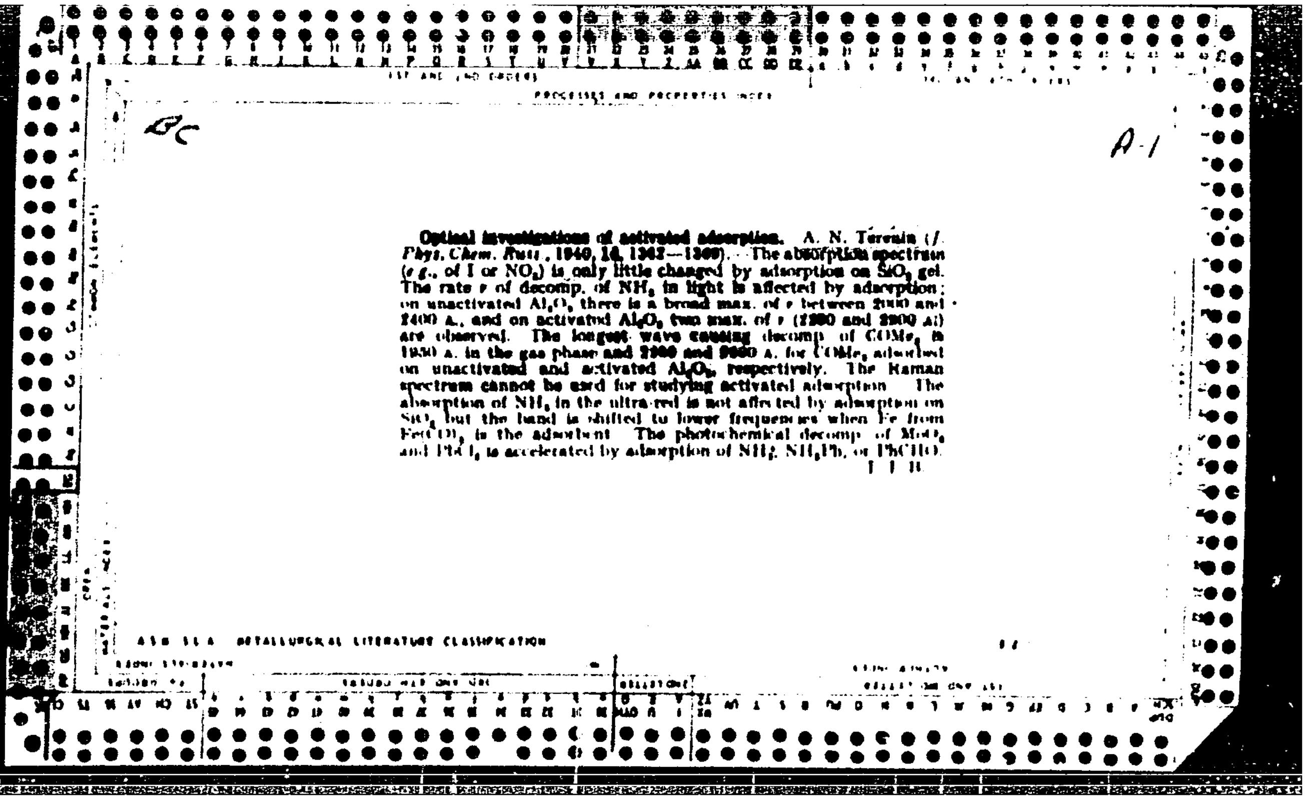
Spectral investigation of chemical processes in organic compounds at low temperatures. A. N. Terenin, N. Yakovkin and B. Volobuyev. *Acta Physicochim. U. R. S. S.* **12**, 617-36 (1940) (in English).—The different kinds of interaction (electrostatic, H-bond formation, chem. combination) of the benzaldehyde (I) carbonyl group with other mols. are revealed by the fluorescence spectra obtained at liquid air temps. In alc., [illegible] or acetone soln. the CO Raman frequency for I is 1620 cm.$^{-1}$, that for pure I is 1560 cm.$^{-1}$. When a deposit of I sublimed onto a Bi, Sb, Cd or Pt surface at −180° is allowed to warm up to −20° and then again cooled to −180°, a strong green fluorescence due to a soln. of benzoin in I appears at λ 5300 in place of the pure blue I fluorescence. Acetophenone shows a Raman frequency of 1450 cm.$^{-1}$ and an extra band at 19,000 cm.$^{-1}$. Fluorescence spectra are also shown for bibenzyl, benzoic acid, benzyl alc. and hydrobenzoin. T. contends that the blue luminescence observed by Goldstein, *et al.* (cf. Marsh, *C. A.* **21**, 1763) in a variety of aromatic compds. is in reality due to traces of aromatic aldehydes formed by surface oxidation. F. H. R.

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

Spectral investigation of chemical processes in organic compounds at low temperatures. II. Aniline, acetaldehyde, bibenzyl, benzaldehyde and naphthalene. A. N. Terenin. *Acta Physicochim. U. R. S. S.* 13, 1-30(1940) (in English); cf. *C. A.* 35, 978¹.—Thin films of org. compds. were sublimed *in vacuo* onto a surface cooled to −180°, irradiated by ultraviolet light of 4000-2000 A., and the fluorescence spectra and their changes observed. On irradiation by 4000-3100 A., aniline gives a violet fluorescence from 3150 A. into the visible, max. at 3300 A. and shifted +200-300 A. with respect to that for gaseous aniline. The intensity reaches satn. and obeys a *hyperbolic decay law*. Illumination by 2000-2200 A. gives first a violet, then a green fluorescence which shows no afterglow and is ascribed to *phenazine* formed by photodehydrogenation. The increased area of the afterglow is ascribed to a migration of H atoms in the crystal lattice, as supported by the enhancement of this effect on addn. of NH_3, or of excitations as supported by the presence of this effect also on irradiation by longer wave lengths. Acetaldehyde and light of 4000-3100 A. gives blue luminescence, a continuous spectrum and an *exponential decay*. Bibenzyl with 2000-2200 A. alone or in presence of NH_3 gives a fluorescence without time lag. Benzaldehyde alone shows no change of fluorescence but on diln. in solvents or dispersion in ice, NaI or TlI, the spectrum changes rapidly, owing to formation of benzoin. Naphthalene alone gives a permanent deep-violet fluorescence; in the presence of CCl_4 vapor and wave lengths below 3000 A., this quickly changes to an intense white fluorescence ascribed to a complex dehydrogenation-polymerization product. On melting and refreezing, a yellow-green spectrum with discrete bands results, ascribed to a dimer, or to products akin to those described by Scheibe (*C. A.* 31, 3789⁹; 32, 8870⁴).

F. H. Rathmann

ASM-SLA METALLURGICAL LITERATURE C



PROCESSES AND PROPERTIES INDEX

8c

A-1

Optical investigations of activated adsorption. A. N. Terenin (*J. Phys. Chem. Russ.*, 1940, 14, 1362—1369). The absorption spectrum (*e.g.*, of I or NO_2) is only little changed by adsorption on SiO_2 gel. The rate *v* of decomp. of NH_3 in light is affected by adsorption: on unactivated Al_2O_3 there is a broad max. of *v* between 2000 and 2400 A., and on activated Al_2O_3 two max. of *v* (2200 and 2900 A.) are observed. The longest wave causing decomp. of $COMe_2$ is 1930 A. in the gas phase and 2300 and 2600 A. for $COMe_2$ adsorbed on unactivated and activated Al_2O_3, respectively. The Raman spectrum cannot be used for studying activated adsorption. The absorption of NH_3 in the ultra-red is not affected by adsorption on SiO_2, but the band is shifted to lower frequencies when Fe from $Fe(OH)_3$ is the adsorbent. The photochemical decomp. of MeI, and PbI_2 is accelerated by adsorption of NH_3, NH_2Ph, or PhCHO.

J. J. B.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

C A

3

Correction to the paper: Spectral investigation of chemical processes in organic compounds at low temperature. II. A. N. Terenin. *Acta Physicochimica U. R. S. S.* 14, 660-7(1941).—The previously observed spreading of the after-glow in the photoluminescence of aniline vapors (cf. *C. A.* 35, 978^1, 1701^8) was due to parasitic ultraviolet radiation. F. H. Rathmann

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

[illegible] 11 — 2, Molecular St.

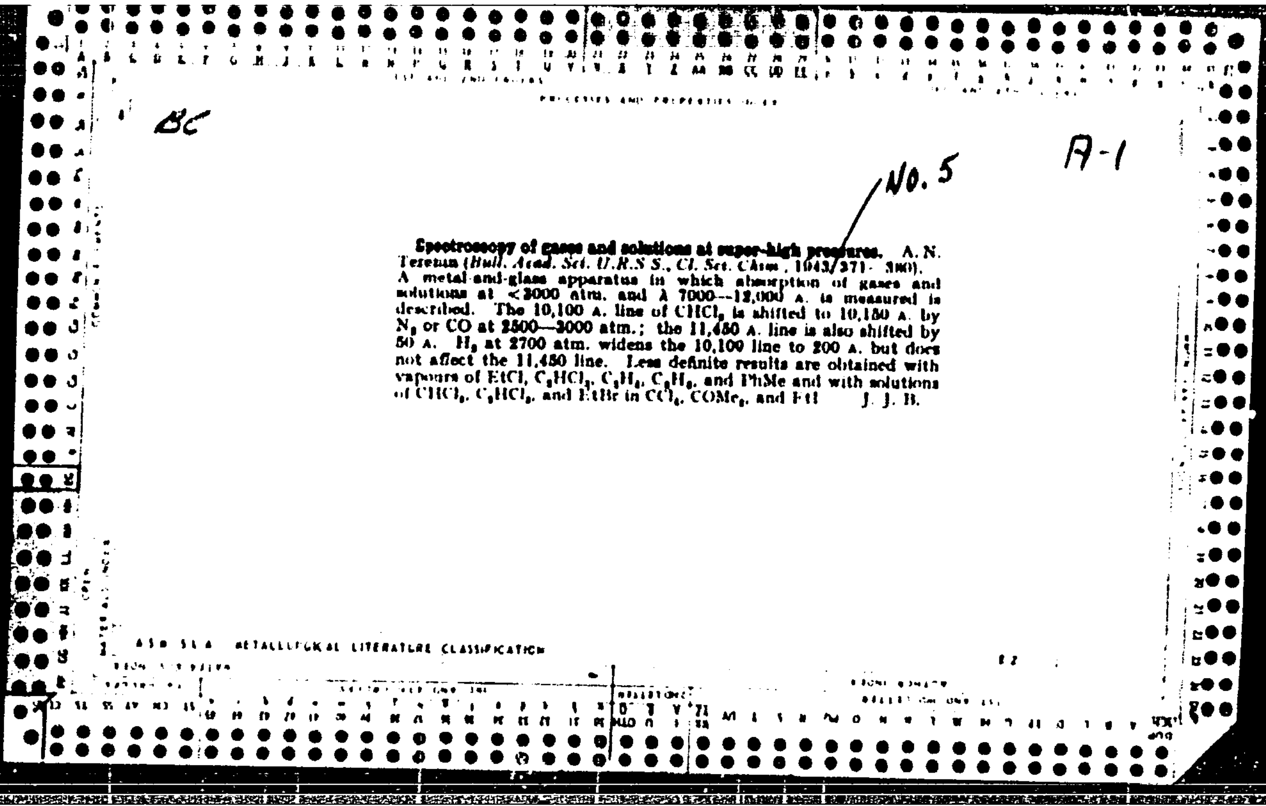
NOS. 5-6

Infra-red emission of the electric discharge in molecular gases and its significance for chemical kinetics. A. N. Terenin and H. G. Neuimin (*Acta Physicochim. U.R.S.S.*, 1942, **16**, 257–271). The infra-red emission of the discharge in CO, CO_2, and CH_4, and their mixtures with H_2, N_2, He, A, and O_2, which themselves do not emit in the infra-red, has been investigated in the λ range 1–7 μ, to obtain information about the transfer of vibrational energy in mol. collisions. CO has a band at 7 μ, CO_2 at 4·6 and 2·8 μ, and CH_4 a wide band with a max. at 2·3 μ. The infra-red emission of CO and CO_2 increases with increasing pressure and reaches a max. at 80–100 mm. The infra-red radiation is due to impacts with slow electrons which give up part of their kinetic energy to the mol. vibrations. The relation between intensity of radiation and pressure is obtained. The effect of the added gases on the emission of CO and CO_2 was investigated. He and H_2 cause quenching, N_2 causes increase in emission, and A and O_2 have no effect. CH_4 and $COMe_2$ decompose in the discharge with powerful infra-red emission.

A. J. M.

TERENIN, A. N.

"The Method of Differential Spectra in the Near Infrared and Its Application to the Investigation of Molecular Interadtion," Acta Phys., Vol. XVII, No. 5-6, 1942.



PROCESSES AND PROPERTIES INDEX

BC

A-1

No. 5

Spectroscopy of gases and solutions at super-high pressures. A. N. Terenin (*Bull. Acad. Sci. U.R.S.S., Cl. Sci. Chim.*, 1943, 371–380). A metal-and-glass apparatus in which absorption of gases and solutions at <3000 atm. and λ 7000—12,000 A. is measured is described. The 10,100 A. line of $CHCl_3$ is shifted to 10,150 A. by N_2 or CO at 2500—3000 atm.; the 11,450 A. line is also shifted by 50 A. H_2 at 2700 atm. widens the 10,100 line to 200 A. but does not affect the 11,450 line. Less definite results are obtained with vapours of EtCl, C_2HCl_3, C_2H_4, C_6H_6, and PhMe and with solutions of $CHCl_3$, C_2HCl_3, and EtBr in CCl_4, $COMe_2$, and EtI. J. J. B.

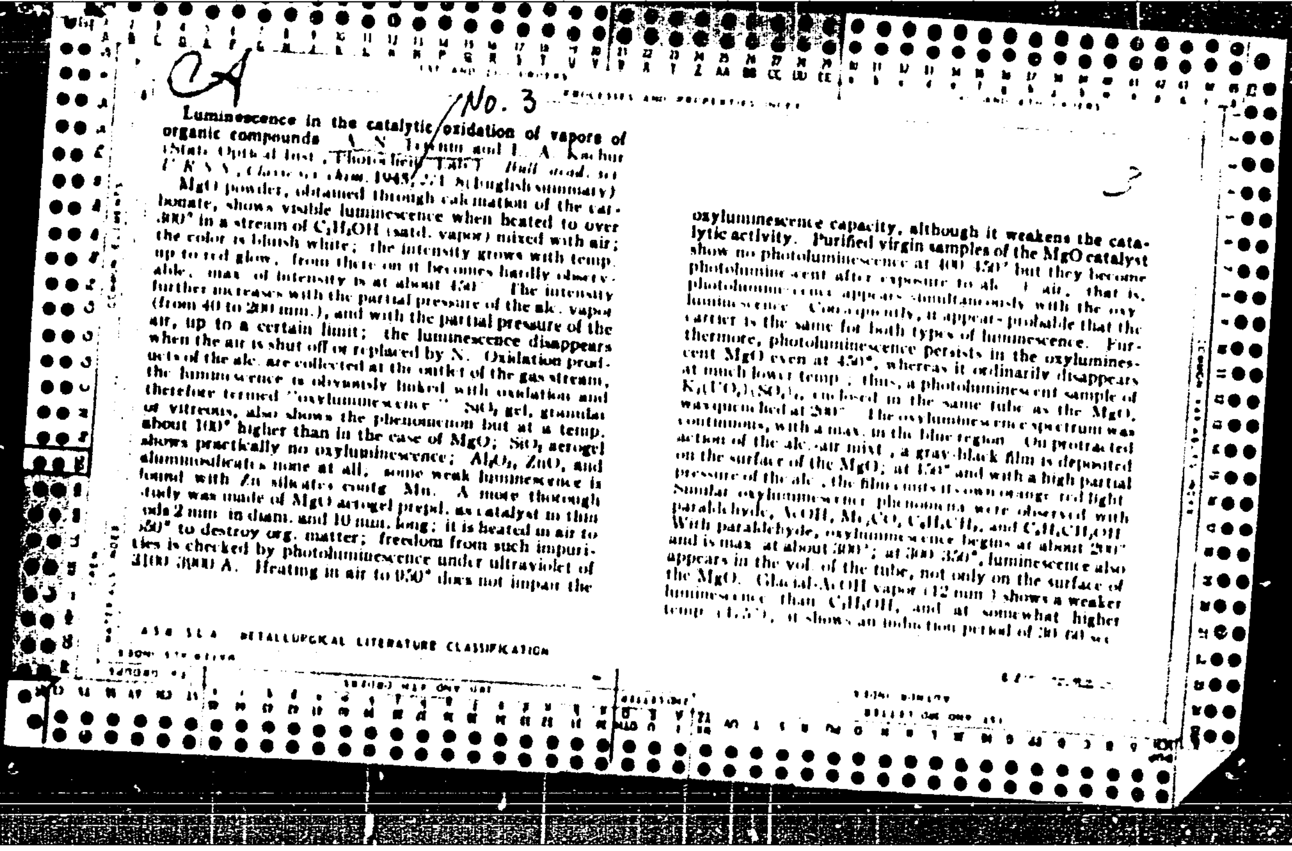
ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

3

Photochemical processes in aromatic compounds. A. N. Terenin. *Acta Physicochem. U. R. S. S.* 18, 210-41 (1943) (In English). The assumption of a definite shape for the potential-energy surfaces of the ground and excited states and of the existence of a definite angle between their principal sections is used to explain the following facts established for gaseous aromatic compounds in previous work at this same lab.: (a) the change from sharp bands to a continuous emission spectrum on relatively small increase of the magnitude of the exciting light quantum; (b) the internal dissipation of the absorbed energy, exhibited by the low emission yield of most compds.; (c) the anti-Stokes optical excitation with energy gain in emission of about 1 e. v.; (d) the disappearance of the structure in the emission and absorption spectra on overheating the vapor. From the thermal quenching of the emission in aniline and biacetyl vapors that takes place during the lifetime of the excited mol., values are deduced for the activation energy of this unimol. disruption process owing to internal redistribution of vibrational energy. Evidence pointing to the existence of a long-lived metastable electronic state in closely related derivs. of benzene in the condensed state at low temps., as well as in the gaseous state, is summarized and the view advanced that this state corresponds to a triplet term of the aromatic ring. The importance in the photokinetics of aromatic compds. of such a long-lived and highly reactive (biradical) excited state is emphasized and the term "photoactivated mols." proposed for them. The intimate connection between the peculiar emission spectra of benzene derivs. in the visible (Hauptspektrum) at low temps. and their polymerization processes is satisfactorily accounted for. Various reaction mechanisms of O with aromatic mols. are discussed from the viewpoint of conservation of the electronic spin. The property of paramagnetic O to induce forbidden transitions in these mols. is stressed under the name "paramagnetic quenching." Photochem. reactions of solid dye-films with O and the formation of unstable intermediate products can be detected with the help of changes in the photocond. of the films. The interaction of aromatic mols. adsorbed on superficially oxidized org. adsorbents (paraffin aerogel, palmitic acid, polyoxymethylene) with fluorescent centers of the surface (carbonyl groups) has been investigated with the help of fluorescence quenching and a photoactivation of the adsorption process has been ascertained. Organic substances such as C_6H_5OH, $C_6H_5NO_2$, $C_6H_5N(CH_3)_2$, $C_6H_5NH_2$ and $(CH_3CO)_2$ induce strong quenching, CCl_4 and $CHCl_3$ weak quenching, while C_6H_6, C_6H_5Cl, C_6H_5Br, CO_2, CO, H_2, N_2 and H_2O produced no quenching. A reaction scheme for the destructive photobleaching of dyes by oxidation is proposed as based on the Bach-Engler theory of the autoxidation of org. compds.

F. H. Rathmann

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



CA

No. 3

3

Luminescence in the catalytic oxidation of vapors of organic compounds. A. N. Terenin and I. A. Kachur (State Optical Inst., [illegible]). Bull. acad. sci. U.R.S.S., Classe sci. chim. 1945, [illegible] (English summary).

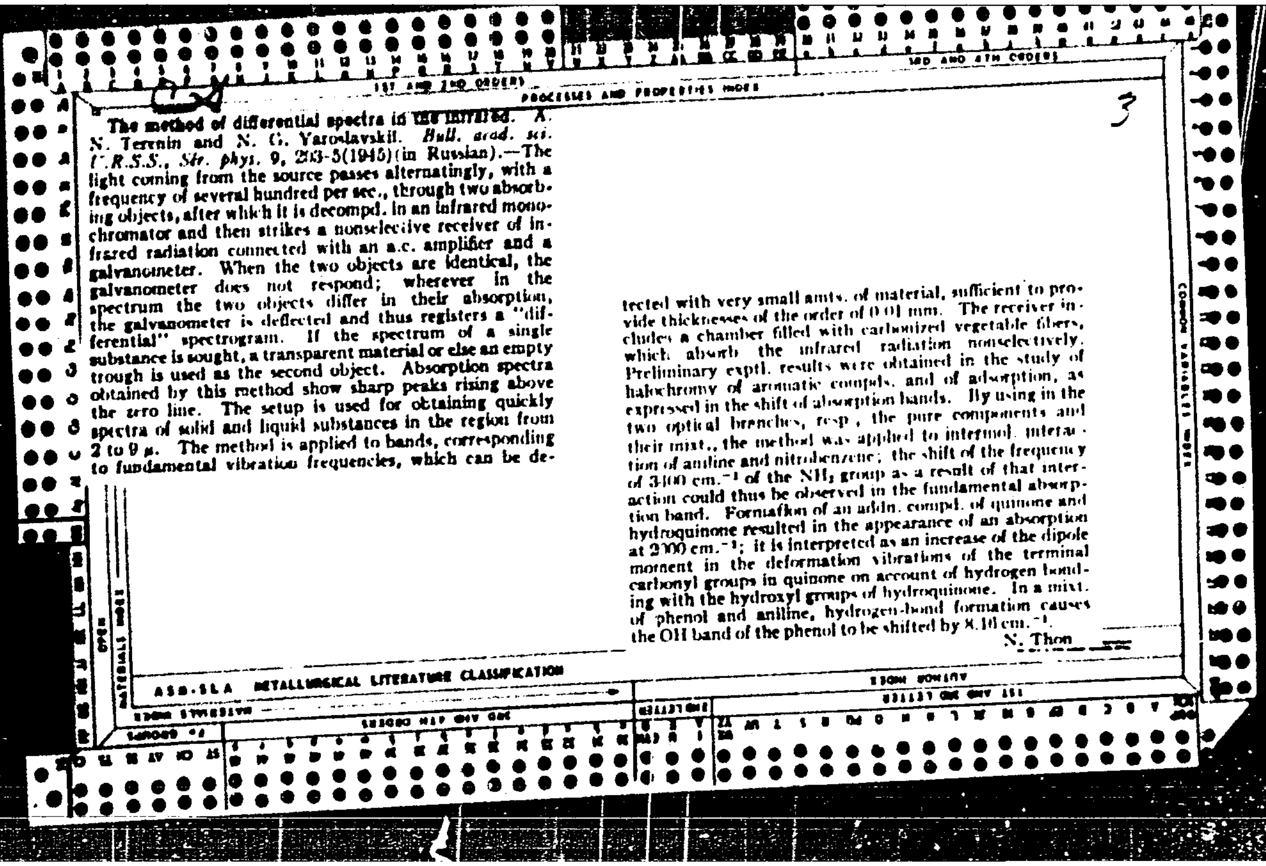
MgO powder, obtained through calcination of the carbonate, shows visible luminescence when heated to over
300° in a stream of C_2H_5OH (satd. vapor) mixed with air;
the color is bluish white; the intensity grows with temp.
up to red glow, from there on it becomes hardly observable; max. of intensity is at about 450°. The intensity
further increases with the partial pressure of the alc. vapo
(from 40 to 200 mm.), and with the partial pressure of the
air, up to a certain limit; the luminescence disappears
when the air is shut off or replaced by N. Oxidation products of the alc. are collected at the outlet of the gas stream,
the luminescence is obviously linked with oxidation and
therefore termed "oxyluminescence." SiO_2 gel, granular
or vitreous, also shows the phenomenon but at a temp.
about 100° higher than in the case of MgO; SiO_2 aerogel
shows practically no oxyluminescence; Al_2O_3, ZnO, and
aluminosilicates none at all; some weak luminescence is
found with Zn silicates contg. Mn. A more thorough
study was made of MgO aerogel prepd. as catalyst in thin
ods 2 mm. in diam. and 10 mm. long; it is heated in air to
50° to destroy org. matter; freedom from such impurities is checked by photoluminescence under ultraviolet of
3100-3600 A. Heating in air to 950° does not impair the

oxyluminescence capacity, although it weakens the cata-
lytic activity. Purified virgin samples of the MgO catalyst
show no photoluminescence at 400-450° but they become
photoluminescent after exposure to alc. + air, that is,
photoluminescence appears simultaneously with the oxy
luminescence. Consequently, it appears probable that the
carrier is the same for both types of luminescence. Fur-
thermore, photoluminescence persists in the oxylumines-
cent MgO even at 450°, whereas it ordinarily disappears
at much lower temp.; thus, a photoluminescent sample of
$K_2(UO_2)_2(SO_4)_3$, enclosed in the same tube as the MgO,
was quenched at 200°. The oxyluminescence spectrum was
continuous, with a max. in the blue region. On protracted
action of the alc.-air mixt., a gray-black film is deposited
on the surface of the MgO; at 450° and with a high partial
pressure of the alc., the film emits its own orange-red light.
Similar oxyluminescence phenomena were observed with
paraldehyde, AcOH, Me_2CO, $C_6H_5CH_3$, and $C_6H_5CH_2OH$.
With paraldehyde, oxyluminescence begins at about 200°
and is max. at about 300°; at 300-350°, luminescence also
appears in the vol. of the tube, not only on the surface of
the MgO. Glacial AcOH vapor (12 mm.) shows a weaker
luminescence than C_2H_5OH, and at somewhat higher
temp. (450°), it shows an induction period of 30-60 sec.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

With acetone (180 mm.) the black film is formed quickly. It is less abundant with benzyl alc. (10 mm.) than with $C_5H_{11}OH$, luminescence at 450-600° is white with a yellow-green tinge, the spectrum continuous (no lines of benzaldehyde); microscopic examn. reveals that yellow light is emitted by only a fraction of the surface of the MgO, the remainder of the surface showing the same shade as in oxyluminescence with $C_5H_{11}OH$. A definite relation with catalytic activity was established by the observation that poisoning by CCl_4 vapor at 350° irretrievably destroys the oxyluminescent ability of MgO even if the black film is removed by heating in air at 550°. Expts. with luminophors (phosphors) such as Zn silicates contg. Mn or synthetic rubies, in view of ascertaining whether the oxidation of the org. compds. also excites the proper luminescence of the solid bodies, were inconclusive. The carrier of both photo- and oxyluminescence is assumed to be a highly condensed oxidation product of alc. (aldehyde pitch); luminescence in the visible region proves the presence of CO groups. Oxyluminescence seems to require contact of dehydrogenating and oxidizing catalysts, dehydrating catalysts (Al_2O_3) are not active. The energy supplied to the oxyluminescent product must be at least 70 cal./mole.

N. Thon



3

The method of differential spectra in ~~the infrared~~. A. N. Terenin and N. G. Yaroslavskii. *Bull. acad. sci. U.R.S.S., Sér. phys.* 9, 233-5(1945)(in Russian).—The light coming from the source passes alternatingly, with a frequency of several hundred per sec., through two absorbing objects, after which it is decompd. in an infrared monochromator and then strikes a nonselective receiver of infrared radiation connected with an a.c. amplifier and a galvanometer. When the two objects are identical, the galvanometer does not respond; wherever in the spectrum the two objects differ in their absorption, the galvanometer is deflected and thus registers a "differential" spectrogram. If the spectrum of a single substance is sought, a transparent material or else an empty trough is used as the second object. Absorption spectra obtained by this method show sharp peaks rising above the zero line. The setup is used for obtaining quickly spectra of solid and liquid substances in the region from 2 to 9 μ. The method is applied to bands, corresponding to fundamental vibration frequencies, which can be detected with very small amts. of material, sufficient to provide thicknesses of the order of 0.01 mm. The receiver includes a chamber filled with carbonized vegetable fibers, which absorb the infrared radiation nonselectively. Preliminary exptl. results were obtained in the study of halochromy of aromatic compds. and of adsorption, as expressed in the shift of absorption bands. By using in the two optical branches, resp., the pure components and their mixt., the method was applied to intermol. interaction of aniline and nitrobenzene; the shift of the frequency of 3400 cm.$^{-1}$ of the NH_2 group as a result of that interaction could thus be observed in the fundamental absorption band. Formation of an addn. compd. of quinone and hydroquinone resulted in the appearance of an absorption at 2300 cm.$^{-1}$; it is interpreted as an increase of the dipole moment in the deformation vibrations of the terminal carbonyl groups in quinone on account of hydrogen bonding with the hydroxyl groups of hydroquinone. In a mixt. of phenol and aniline, hydrogen-bond formation causes the OH band of the phenol to be shifted by 8.10 cm.$^{-1}$.

N. Thon

TERENIN, A. N. (Acad.)

"Action of Media on the Photoluminescence of Simple Aromatic Compounds," a report submitted at the General Assemblies of OFMN in 1944

IAN-Ser Fiz, Vol 9, No 3, 1945

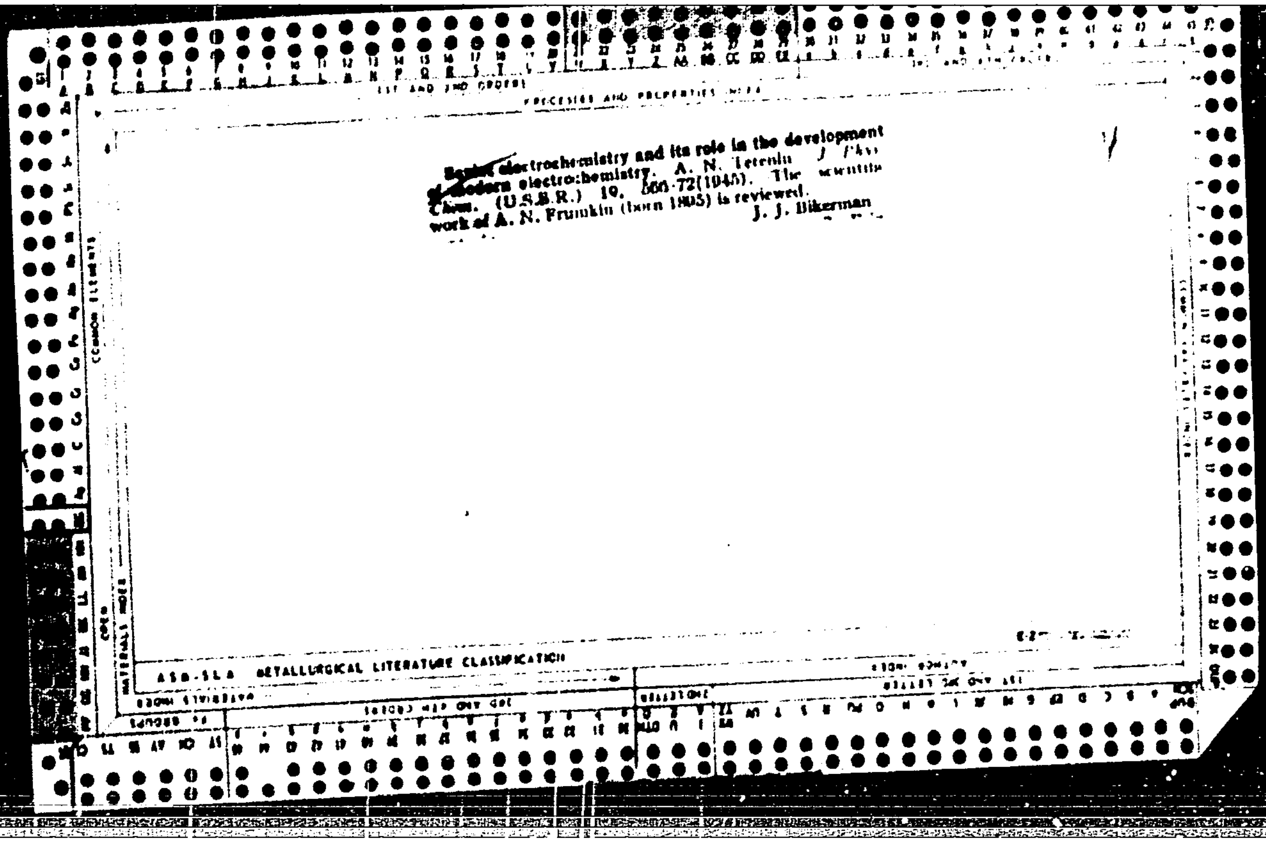
C-4

3

The influence of the medium in the photoluminescence of organic compounds. A. N. Terenin. *Bull. acad. sci. U.R.S.S., Sér. phys.* 9, 301 (5) 1945). As previous expts. (cf. C.A. 38, 5149) have shown, in aromatic compds. the absorbed light energy does not degenerate into thermal energy; presence of foreign polyatomic gas increases the fluorescence especially at short wave lengths of excitant light. In aromatic compds. the different modes of vibration are closely connected to the electronic states of the mol. The author discusses a case of a mol. with a double bond in 2 possible stereoisomeric configurations. Potential curves show that it is necessary to surmount a potential barrier to obtain the rotation of the plane in the mol. However, starting with the excited state of one configuration, the normal state of the other can be obtained with only a small amount of activation energy ("internal deactivation"). The duration of the excited state is therefore short (10^{-8}–10^{-9} sec.). In solid solns. the appearance of phosphorescence explained by Franck, Livingston, and Pringsheim by the formation of metastable states of the tautomer which (cf. C.A. 33, 2114) was not excited is studied and the explanation is rejected. According to T. in this case the metastable state is due to a chem. change in the mol. consisting in the shift of a proton to the mol. of the solvent. Solid solns. of indicators of pH were made by dissolving phenolphthalein, cyanin chloride, aurine, methyl red, and acridine chloride in urea, acetamide, benzophenone, benzoic acid, and mannitol. A color change of the indicator appears corresponding to a partial loss of a proton and a strengthening of the ionic structure of the mol. The infrared spectra of such colored compds. seem to be modified.

S. Pakswer

ASB-SLA METALLURGICAL

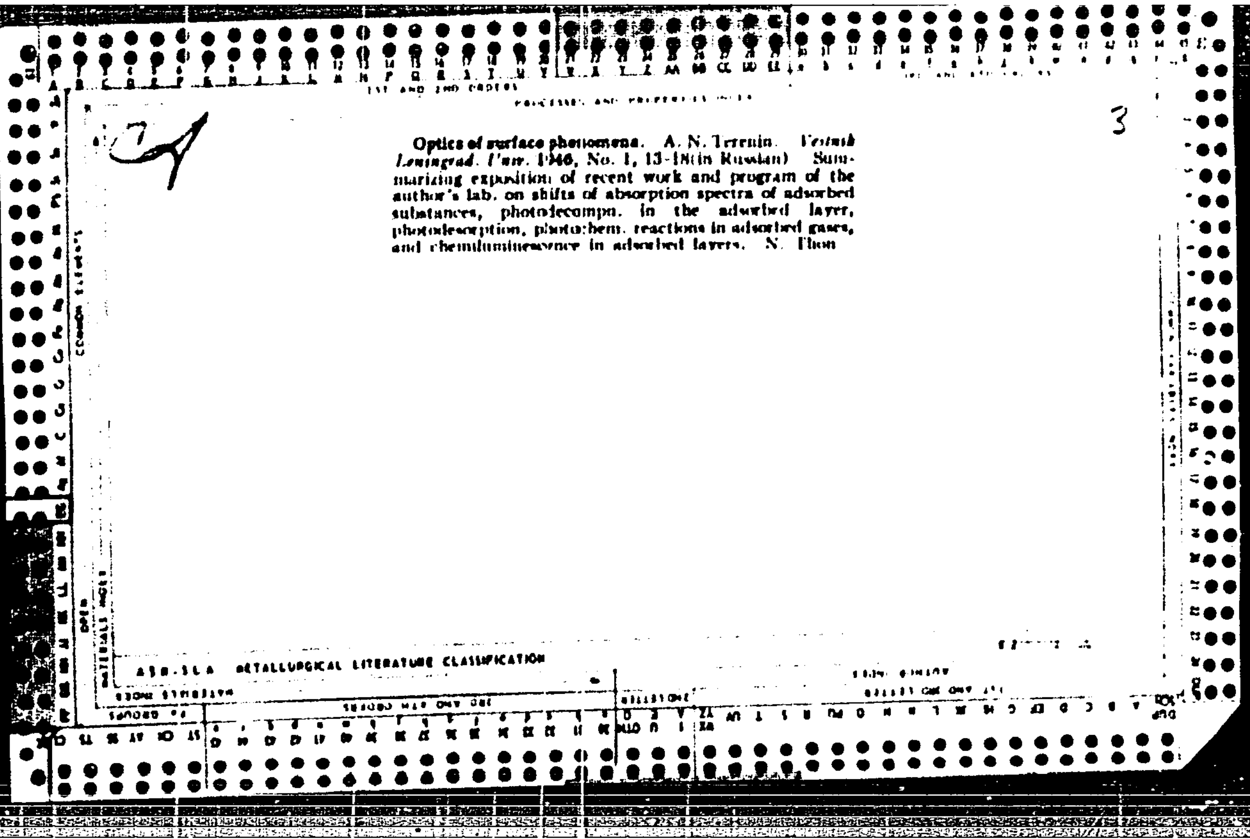


PROCESSES AND PROPERTIES INDEX

Soviet electrochemistry and its role in the development of modern electrochemistry. A. N. Terenin. J. Phys. Chem. (U.S.S.R.) 19, 566-72(1945). The scientific work of A. N. Frumkin (born 1895) is reviewed.

J. J. Bikerman

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION



A

3

Optics of surface phenomena. A. N. Terenin. *Vestnik Leningrad. Univ.* 1946, No. 1, 13-18 (in Russian). Summarizing exposition of recent work and program of the author's lab. on shifts of absorption spectra of adsorbed substances, photodecompn. in the adsorbed layer, photodesorption, photochem. reactions in adsorbed gases, and chemiluminescence in adsorbed layers. N. Thon

TERENIN, Aleksandr Nikolayevich, Academician

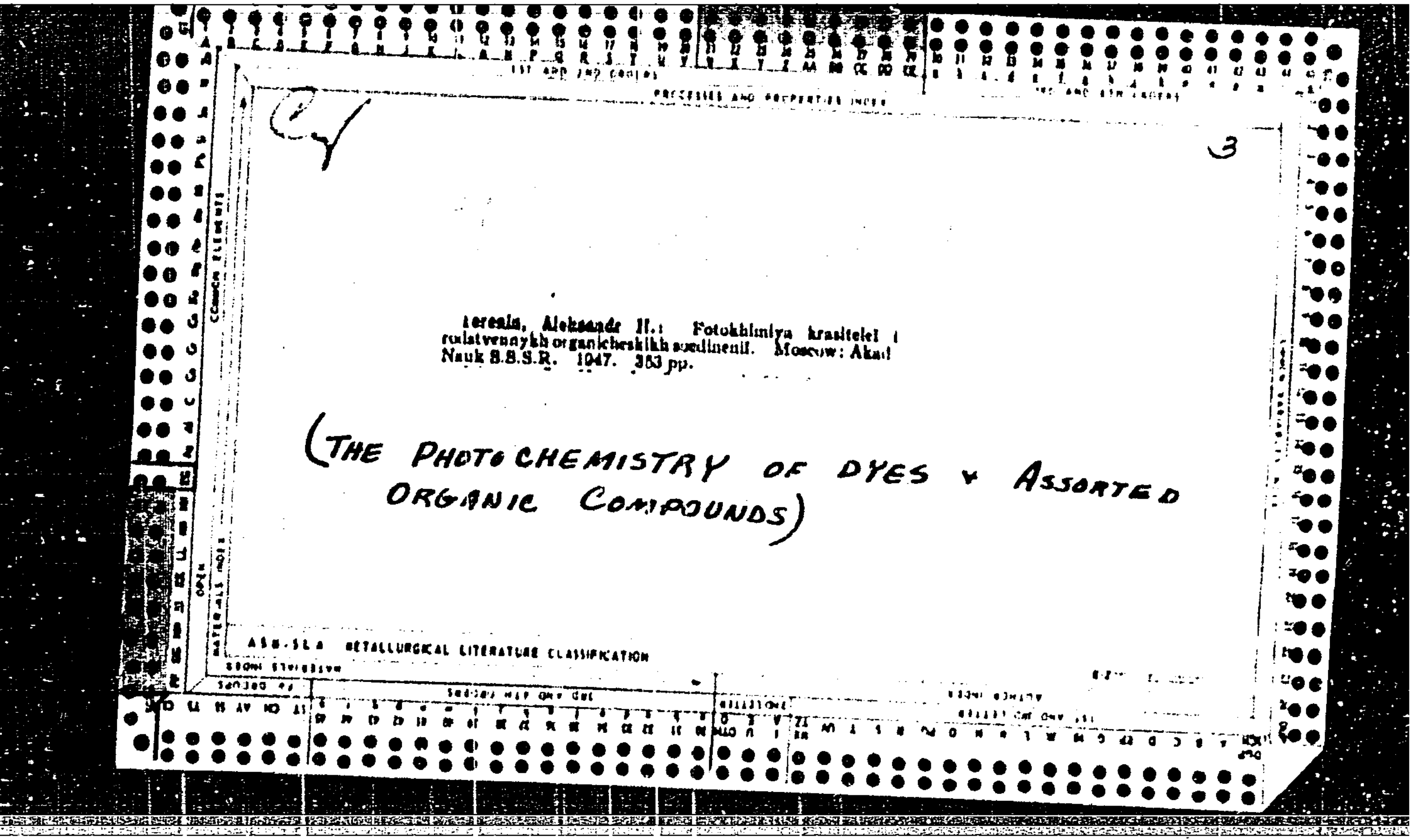
Head of Laboratory at the State Optical Institute, Leningrad, RSFSR

Science

Wrote "Photochemical Processes in Aromatic Compounds" (FOR WHICH 1946 STALIN PRIZE AWARDED).

Soviet Source: N: Pravda No. 23, Moscow, 27 Jan. 1946

Abstracted in USAF "Treasure Island", on file in Library of Congress, Air Information Division, Report No. 79184

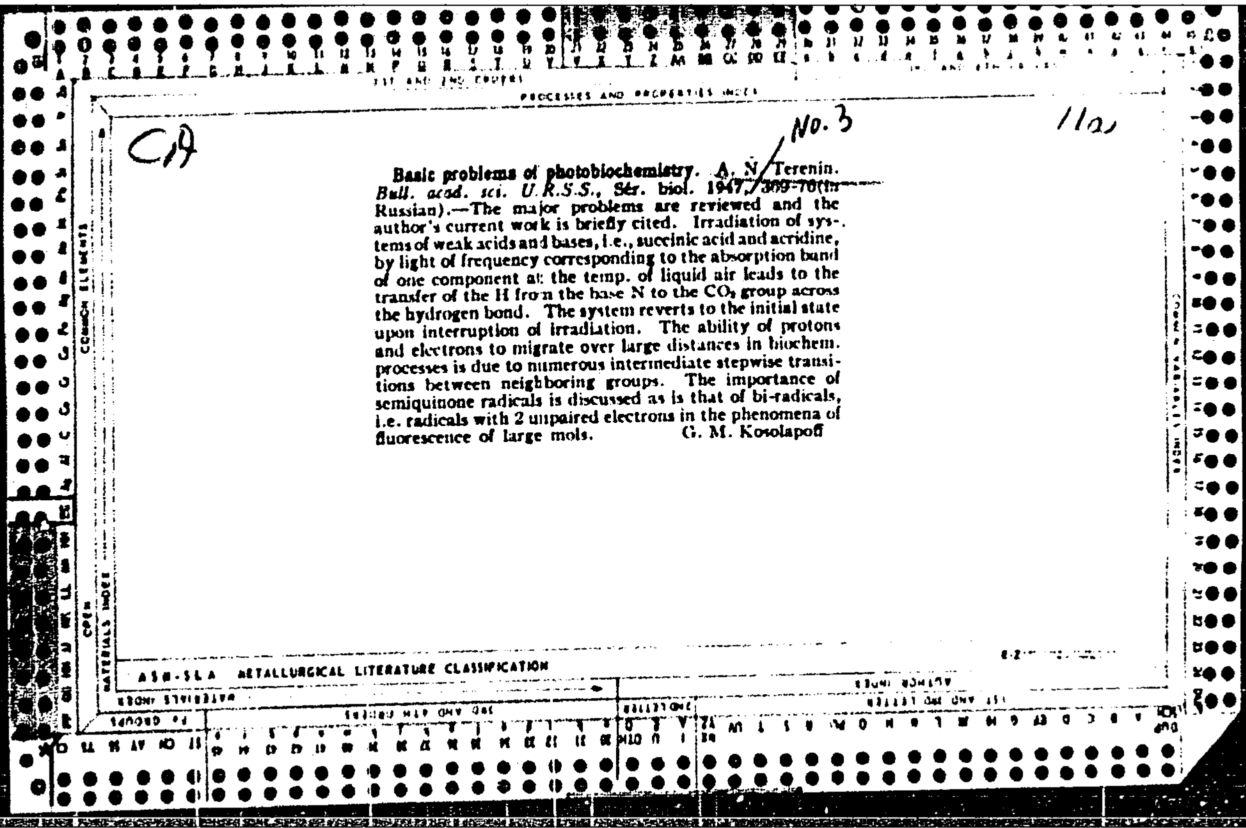


C

3

Terenin, Aleksandr N.: Fotokhimiya krasitelei i rodstvennykh organicheskikh soedinenii. Moscow: Akad Nauk S.S.S.R. 1947. 353 pp.

(THE PHOTOCHEMISTRY OF DYES & ASSORTED ORGANIC COMPOUNDS)



CA

No. 3

11a)

Basic problems of photobiochemistry. A. N. Terenin. *Bull. acad. sci. U.R.S.S., Sér. biol.* 1947, / 309-70(In Russian).—The major problems are reviewed and the author's current work is briefly cited. Irradiation of systems of weak acids and bases, i.e., succinic acid and acridine, by light of frequency corresponding to the absorption band of one component at the temp. of liquid air leads to the transfer of the H from the base N to the CO_2 group across the hydrogen bond. The system reverts to the initial state upon interruption of irradiation. The ability of protons and electrons to migrate over large distances in biochem. processes is due to numerous intermediate stepwise transitions between neighboring groups. The importance of semiquinone radicals is discussed as is that of bi-radicals, i.e. radicals with 2 unpaired electrons in the phenomena of fluorescence of large mols. G. M. Kosolapoff

ТЕРЕНИН А. Н.

USSR/Chemistry - Protons
Chemistry - Photochemistry   Oct 1947

"Phototransfer of Protons in Organic Systems," Acad A. N. Terenin, A. V. Karyakin, 4 pp

"Dok Akad Nauk SSSR, Nova Ser" Vol LVIII, No 3

PA 49T1

Transfer between molecules in organic compounds facilitated as result of the influence of light in the first stages of the photochemical oxidizing-reducing process. Authors describe experiments conducted to study the "interlinked" systems, composed of acid as well as ordinary molecules, united by strong hydrogen bond, and in which the protons to large degree belong simultaneously to both partners of the union. They

49T1

USSR/Chemistry - Protons (Contd)   Oct 1947

used colored as well as fluorescent indicators for acidity. Vacuum technique was also used. Submitted 30 May 1947.

49T1

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

3

Proton transfer between organic molecules caused by light. A. N. Terenin and A. Kariakin (Optical Inst., Leningrad). *Nature* 159, 881-2(1947).—Proton exchanges between acidic and basic org. compds. in soln. occur spontaneously. A proton transfer against the thermodynamic potential under the action of light has been demonstrated. In order to observe a proton transfer in the absence of a solvent, both components were sublimed *in vacuo* onto a cooled surface. The proton donors were easily sublimable cryst. org. acids, such as oxalic, benzoic, salicylic, succinic, and terephthalic. The proton acceptor was acridine; its neutral mol. has a violet fluorescence, which becomes bright green in acidified solns. At −180° the violet fluorescence, which is excited by 366 mμ, rapidly changes to green. When the sublimed, composite, green-fluorescing film is exposed to ultraviolet light of about 250 mμ, the fluorescence assumes a violet color, with a spectrum characteristic of the acridine mol. When this radiation is stopped, the green fluorescence gradually returns. The process can be repeated indefinitely at −180°.

G. M. Petty

COMMON ELEMENTS

MATERIALS INDEX

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

TERENIN, A. N.

PA 37/49T113

USSR/Physics
Light

Nov 48

Nov 48

"Splitting of Molecules Through the Activity of Light," A. N. Terenin, 16 pp

"Uspekhi Fiz Nauk" Vol XXXVI, No 3

Terenin summarizes activities in this field for past 10 years, referring to work done by himself, Tibilov and Neuyman. Report was read at the Second Lecture imeni D. I. Mendeleyev at Leningrad U 21 Feb 47. Terenin hopes his report will show the way for future research.

[illegible]

37/49T113

TERENIN, A. N.

PA 22/49T58

USSR/Medicine -- Biology Jan 49
Medicine -- Energy

"The Problem on Migration of Energy in Biological Processes," A. N. Terenin, 8½ pp

"Uspekhi Fiz Nauk" No 1

Examines experimental proofs of energy migration in biological processes. Discusses theoretical concepts of biocatalytic processes developed in an article by N. Ril' (See 11/49T78) under following: model of action of oxidizing and reducing enzymes, model of action of hydrolase, and energy migration in process of CO_2 assimila-

22/49T58

[redacted]

USSR/Medicine -- Biology (Contd) Jan 49

tion. Concludes that there is insufficient experimental evidence to warrant ~~regarding~~ albumen as semiconductor.

22/49T58

[redacted]

PA 36/49T100

USSR/Physics
Fluorescence
Chemistry - Anthraquinone

Jan/Feb 49

"The Extinguishing of Fluorescence and Metastable Triplet States," S. I. Karyakin, A. N. Terenin, State Opt Inst, 9 pp

"Iz Ak Nauk SSSR, Ser Fiz" Vol XIII, No 1

Conducted extensive investigation of anthraquinone and 24 of its derivatives in vaporous and adsorbed states under high vacuum to determine which features in molecular structure are responsible for extinguishing of its fluorescence by oxygen. Tabular results

[redacted]

36/49T100

USSR/Physics (Contd)

Jan/Feb 49

show molecular structure, spectrum maxima of fluorescence for vapors, extinguishing by O_2 on the vapors and the adsorbates, and duration (sec) of excited state.

[redacted]

36/49T100

TERENIN, A. N.

TERENIN, A.N., akademik; FIALKOVSKAYA, O.V., starshiy nauchnyy sotrudnik.

Exchange of electrons between the adsorbed molecules and the catalyzer. Nauch.biul.Len.un. no.23:8-10 '49. (MLRA 10:4)

1. Fizicheskiy institut Leningradskogo ordena Lenina Gosudarstvennogo universiteta.

(Electrons)

TERENIN, A. N.

A. N. TERENIN and A. A. Krasnovskiy

"The Problem of Migration of Energy in Biological Processes" --(full translation available) appeared in the Soviet journal "The Results of the Physical Sciences," 1949, volume No. 27, No. 1.

XXV-1

TERENIN, A. N.

"Splitting of Molecules through the Activity of Light," Uspekhi Fiz. Nauk, Vol. 36, No. 3, 1949.

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

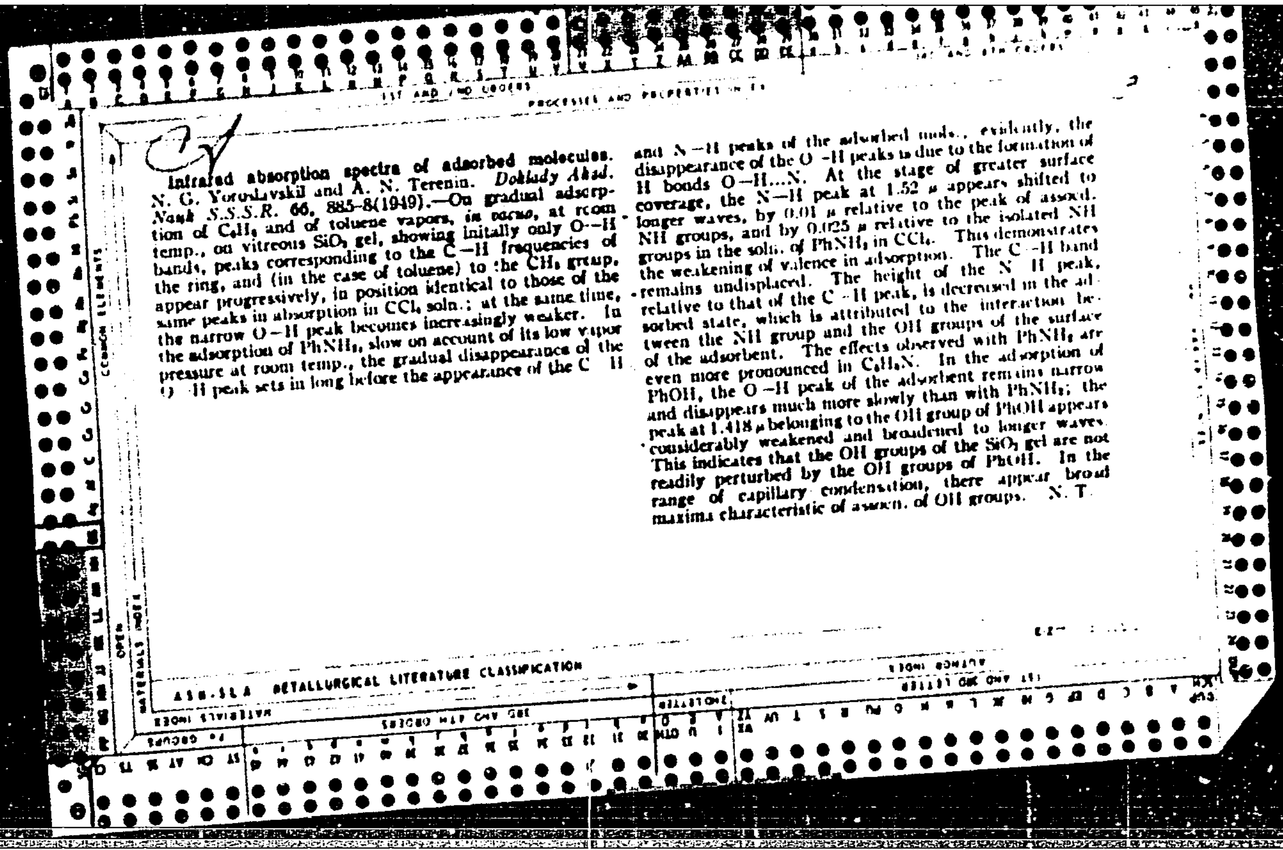
Q

3

Photosensitization of the internal photoeffect in zinc oxide and other semiconductors by adsorbed dyes. V. K. Putseiko and A. N. Terenin. *Zhur. Fiz. Khim.* 23, 676-88(1949); cf. *C.A.* 43, 1278d.—When a dye having an absorption max. at λ_0 mμ is adsorbed on semiconductor, the latter shows photoelec. effect on irradiation with λ_0, although the noncontaminated semiconductor is sensitive only to wave lengths near λ_1, λ_1 being always $< \lambda_0$. If the photosensitivity *s*, i.e., the ratio of voltage produced by light to light intensity, is set equal to 100 for ZnS at its λ_1, it is 10-20 for TlCl ($\lambda_1 \approx 350$ mμ), 80 for TlBr (410 mμ), 30 for TlI (440 mμ), 50, 10, and 1-3 for CdI_2, AgCl, and CdO, resp., 0.5-1 for ZnO (370 mμ), 0.5-1 for pinacyanol, and 3-5 for carbocyanine dyes. Eosin (I) and erythrosin (II) alone show no photoelec. effect but make ZnO, CdO, and PbO sensitive at their λ_0; *s* increases with the concn. of dye soln. from which adsorption took place (the adsorbed amt. was not detd.). Rhodamine B (III) photosensitizes TlCl and ZnO; the *s* of these systems is 5-10 times that of III powder, and powders of ZnS, TiO_2, $BaSO_4$, etc., all dyed with III, show no effect at λ_0; hence the sensitivity of the ZnO-III and TlCl-III systems is not due to that of III crystals. The *s* of ZnO-pinacyanol and ZnO-carbocyanines at λ_0 is less than *s* of pure dyes at λ_0. The dependence of *s* on λ is complicated by the absorption of violet and ultraviolet rays, which cause photoelec. effect in pure semiconductors, by the adsorbed dye. The elec. cond. *s* of ZnO, also in the presence of I, II, or III, is due to electrons. The *s* of III, of TlCl, of TlCl + III, and of ZnO-carbocyanines has mixed character (electrons and "holes"). Anthracene, Ph_2NH, and glycine cannot be made photosensitive by adsorption of dyes.

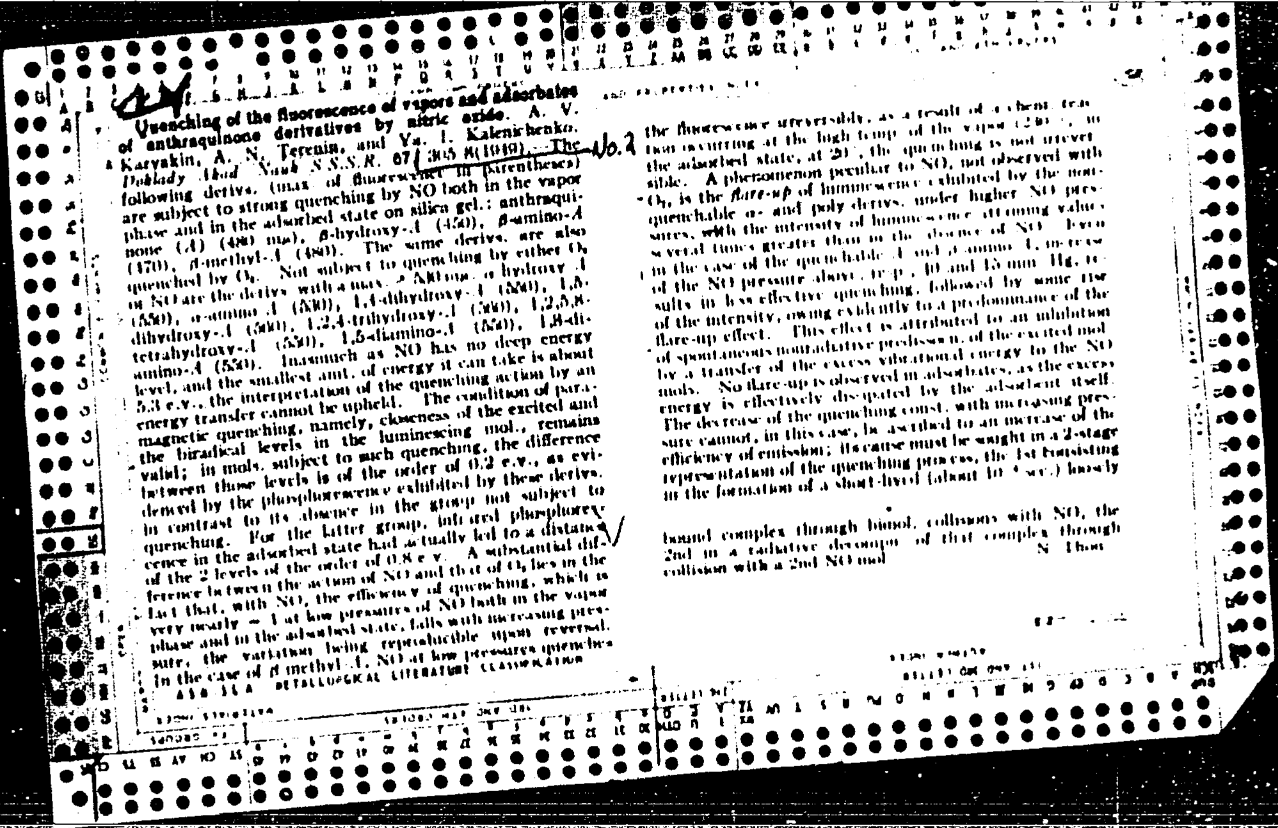
J. J. Bikerman

ASM-SLA METALLURGICAL



Infrared absorption spectra of adsorbed molecules.
N. G. Yoroslavskiĭ and A. N. Terenin. *Doklady Akad.
Nauk S.S.S.R.* 66, 885-8(1949).—On gradual adsorp-
tion of C_6H_6 and of toluene vapors, *in vacuo*, at room
temp., on vitreous SiO_2 gel, showing initally only O—H
bands, peaks corresponding to the C—H frequencies of
the ring, and (in the case of toluene) to the CH_3 group,
appear progressively, in position identical to those of the
same peaks in absorption in CCl_4 soln.; at the same time,
the narrow O—H peak becomes increasingly weaker. In
the adsorption of $PhNH_2$, slow on account of its low vapor
pressure at room temp., the gradual disappearance of the C—H
O—H peak sets in long before the appearance of the C—H

and N—H peaks of the adsorbed mols., evidently, the
disappearance of the O—H peaks is due to the formation of
H bonds O—H...N. At the stage of greater surface
coverage, the N—H peak at 1.52 μ appears shifted to
longer waves, by 0.01 μ relative to the peak of assocd.
NH groups, and by 0.025 μ relative to the isolated NH
groups in the soln. of $PhNH_2$ in CCl_4. This demonstrates
the weakening of valence in adsorption. The C—H band
remains undisplaced. The height of the N—H peak,
relative to that of the C—H peak, is decreased in the ad-
sorbed state, which is attributed to the interaction be-
tween the NH group and the OH groups of the surface
of the adsorbent. The effects observed with $PhNH_2$ are
even more pronounced in C_5H_5N. In the adsorption of
PhOH, the O—H peak of the adsorbent remains narrow
and disappears much more slowly than with $PhNH_2$; the
peak at 1.418 μ belonging to the OH group of PhOH appears
considerably weakened and broadened to longer waves.
This indicates that the OH groups of the SiO_2 gel are not
readily perturbed by the OH groups of PhOH. In the
range of capillary condensation, there appear broad
maxima characteristic of assocn. of OH groups. N. T.



Quenching of the fluorescence of vapors and adsorbates of anthraquinone derivatives by nitric oxide. A. V. Karyakin, A. N. Terenin, and Ya. I. Kalenichenko. *Doklady Akad. Nauk S.S.S.R.* 67, 305-8(1949). No. 2 —The following derivs. (max. of fluorescence in parentheses) are subject to strong quenching by NO both in the vapor phase and in the adsorbed state on silica gel.: anthraquinone (A) (480 mμ), β-hydroxy-A (450), β-amino-A (470), β-methyl-A (480). The same derivs. are also quenched by O_2. Not subject to quenching by either O_2 or NO are the derivs. with a max. > 500 mμ: α-hydroxy-A (550), α-amino-A (580), 1,4-dihydroxy-A (580), 1,5-dihydroxy-A (580), 1,2,4-trihydroxy-A (580), 1,2,5,8-tetrahydroxy-A (550), 1,5-diamino-A (550), 1,8-diamino-A (550). Inasmuch as NO has no deep energy level, and the smallest amt. of energy it can take is about 5.3 e.v., the interpretation of the quenching action by an energy transfer cannot be upheld. The condition of paramagnetic quenching, namely, closeness of the excited and the biradical levels in the luminescing mol., remains valid; in mols. subject to such quenching, the difference between those levels is of the order of 0.2 e.v., as evidenced by the phosphorescence exhibited by these derivs. in contrast to its absence in the group not subject to quenching. For the latter group, infrared phosphorescence in the adsorbed state had actually led to a distance of the 2 levels of the order of 0.8 e.v. A substantial difference between the action of NO and that of O_2 lies in the fact that, with NO, the efficiency of quenching, which is very nearly = 1 at low pressures of NO both in the vapor phase and in the adsorbed state, falls with increasing pressure, the variation being reproducible upon reversal. In the case of β-methyl-A, NO at low pressures quenches the fluorescence irreversibly, as a result of a chem. reaction occurring at the high temp. of the vapor (200°); in the adsorbed state, at 20°, the quenching is not irreversible. A phenomenon peculiar to NO, not observed with O_2, is the *flare-up* of luminescence exhibited by the nonquenchable α- and poly derivs. under higher NO pressures, with the intensity of luminescence attaining values several times greater than in the absence of NO. Even in the case of the quenchable A and β-amino-A, increase of the NO pressure above, resp., 10 and 15 mm. Hg, results in less effective quenching, followed by some rise of the intensity, owing evidently to a predominance of the flare-up effect. This effect is attributed to an inhibition of spontaneous nonradiative predissocn. of the excited mol. by a transfer of the excess vibrational energy to the NO mols. No flare-up is observed in adsorbates, as the excess energy is effectively dissipated by the adsorbent itself. The decrease of the quenching const. with increasing pressure cannot, in this case, be ascribed to an increase of the efficiency of emission; its cause must be sought in a 2-stage representation of the quenching process, the 1st consisting in the formation of a short-lived (about 10^{-8} sec.) loosely bound complex through bimol. collisions with NO, the 2nd in a radiative decompn. of that complex through collision with a 2nd NO mol. N. Thon

ASA-SLA METALLURGICAL LITERATURE CLASSIFICATION

TERENIN, A. N.

PA 3/50T9

USSR/Chemistry - Indicators 11 Sep 49
Solidification

"Color Reaction of Indicators on Solidification of
Organic Melts," Acad A. N. Terenin, A. V. Karyakin,
4 pp

"Dok Ak Nauk SSSR" Vol LXVIII, No 2

Introduced several drops of saturated solutions of
indicators (phenolphthalein, cyanin hydrochloride,
aurin, methyl red, acridine hydrochloride, etc.) in
absolute alcohol, benzene, toluol, carbon tetra-
chloride, and chloroform into dried, weighted por-
tions of powders of carbamide, acetamide, benzo-
phenon, benzoic acid, mannite, and piperazine. Noted

[redacted] 3/50T9

USSR/Chemistry - Indicators (Contd) 11 Sep 49

no appearance or change of color to indicate
cleavage of a proton from an indicator molecule, e.g.
phenolphthalein solution in fused carbamide was
colorless. However, at first moment of solidifica-
tion, an intensive raspberry color appeared (typical
for formation of a phenolphthalein anion, i. e.,
of a phenolphthalein molecule lacking two H^+
protons of hydroxyl group OH). Experiments show
it possible to use color indicators to expose
transient, unstable states of solid organic media
in crystallization process. Submitted 11 Jul 49.

[redacted] 3/50T9

CA

Spectral study of the association of benzaldehyde molecules at low temperatures. A. Terenin, N. Yakovkin, and B. Volobuev (Leningrad State Univ.). *Uchenye Zapiski Leningrad. Gosudarst. Univ.* No. 120, *Ser. Fiz. Nauk*, No. 7, 3-27(1949).—BzH was chosen for an investigation of the fluorescence in the adsorbed state on account of its discrete fluorescence spectrum in the visible; in the gaseous state, it consists of 4 maxima, distant by the vibration frequency of the C=O group, 1730 cm.$^{-1}$. Thin layers of BzH were evapd. and condensed onto carrier surfaces of Cd, Bi, and Sb, or of NaI and TlI, kept at −180°. Adsorption undoubtedly takes place at the C=O group, whereas light is adsorbed in the ring. The amt. of BzH in the adsorbed layer, necessary for the fluorescence to be observable, is of the order of several hundreds of A. units, i.e. of several tens of mol. layers. By comparison with the amt. necessary for observation of the fluorescence of the vapor, about 10-mol. layers on a surface should be sufficient; the discrepancy is attributed to the roughness of the carrier surface. (1) The fluorescence spectrum of BzH on well-outgassed Bi, Cd, or Sb (spectrum *A*) is sky-blue, and differs from that of the vapor in the shift of the peaks to longer waves, and by the change of the intermax. distance (i.e. the vibration frequency of the C=O group) from 1730 to 1560 cm.$^{-1}$. Proof that this change is due, not to an effect of the metal carrier surface, but to assocn. of BzH mols. in the cryst. adsorbed layer, is provided by the independence of spectrum *A* of the nature of the carrier metal and of the thickness of the adsorbed layer, and, further, by the change of the spectrum on simultaneous adsorption of BzH and H_2O. The intensity increases considerably and the fluorescence becomes bright blue (spectrum *B*). This spectrum includes 3 maxima, the positions of which coincide with those of gaseous BzH, and is characterized by a relatively long afterglow of about 20 sec. as compared with 5-10 sec. for spectrum *A*. The metal base has no influence on that phenomenon. The C=O vibration frequency in spectrum *B* is 1650 cm.$^{-1}$. It is plausible to attribute spectrum *B* to isolated, and spectrum *A* to BzH mols. dimerized through H bonds to I.

(I)

A dimer of the structure Ph$\overline{\text{CH.O.CHPh.O}}$ could not give a vibration frequency of the order of 1600 cm.$^{-1}$, and its spectrum should be shifted to shorter waves, which is not observed. (2) If, in the absence of moisture, adsorbed BzH is heated up to −20°, and then cooled back to −190°, a green fluorescence appears (spectrum *C*), characterized by a short afterglow of about 5 sec. This transformation takes place without exposure to ultraviolet light. The new compd., which emits the spectrum *C*, is stable and can be distd. in *vacuo*. For the purpose of its identification, a no. of derivs. and compds. related to BzH were investigated. BzMe

gives a green spectrum, owing to a max. at 5200 A., and a
C=O vibration frequency of 1430–60 cm.$^{-1}$ (as compared
with 1670–1690 cm.$^{-1}$ for gaseous BzMe; the distance be-
tween the long-wave maxima has the abnormally large value
of 2050 cm.$^{-1}$). The max. at 4700 A., characteristic of BzMe,
does not appear in any spectrum of BzH. Consequently,
the spectrum *C* of BzH cannot be attributed to BzMe.
But the spectrum of benzoin, a condensation product of
BzH, does permit an identification of the spectrum *C* of
BzH, provided it is legitimate to identify the broad 5500-A.
max. of benzoin with the narrow 5300-A. band of spectrum
C of BzH. One must assume that the spectrum *C* belongs
to benzoin mols. sepd. in the adsorbed layer by intervening
mols. of unassocd. BzH. Hydrobenzoin in an adsorbed
layer gave a green spectrum with a max. at about 5400 A.,
which should appear only in compds. with a C=O group;
it must, consequently, be concluded that this emission be-
longs to benzoin, dild. by an excess of hydrobenzoin. Ben-
zil gives green fluorescence, with a broad max. at 5800 A.
Oxidation products of BzH, e.g. the hydroperoxide BzOOH,
gave only sky-blue fluorescence, and so did Bz_2O. In con-
clusion, the spectrum *C* is attributed definitely to benzoin.
The conversion of adsorbed BzH to benzoin takes place on
simple heating to −20°, as is prevented if the BzH mols.
are sepd. by intervening H_2O mols. (3) On NaI, the fluores-
cence of BzH is faintly green, white, or blue-green, and be-
comes sky-blue only in thick layers or in the presence of
H_2O; this fluorescence disappears rapidly under the action
of ultraviolet. On TlI, the spectrum is of type *B*; green
fluorescence is observed in thin layers, but its max., at
5500-A., is different from that (5200 A.) of spectrum *C*.
(4) Types *A* and *B* are excited in the range 3300–3100 A.,
with a max. at 2800–2200 A.; the excitation range of type *C*
is about the same, but the max. is somewhat narrower,
2700–2200 A. The fluorescence of BzMe is excited in a
narrower range, 2000–2050 A., with a max. at 2900–2150 A.
(5) Type *B* goes over into type *C* on 15-min. irradiation with
ultraviolet.

N. Thon

CA

3

Nature of the absorption-spectrum shift in the adsorption of aromatic amines on active clays. A. I. Sidorova and A. N. Terenin (Leningrad State Univ.). *Izvest. Akad. Nauk S.S.S.R., Otdel. Khim. Nauk* 1950, 152-61.—A blue color is produced on the surface of bentonite (SiO_2 64.66, Al_2O_3 14.13, Fe_2O_3 1.35, TiO_2 0.38, CaO 2.10, MgO 3.15, Na_2O 2.40, K_2O 1.93, H_2O 6.5-12%) powder, fired at 800° and outgassed, when Ph_2NH vapor is passed over it *in vacuo* at about 150°. This color does not disappear on heating, but is destroyed immediately by passing dry NH_3 under 10 mm. Hg. Preliminary 2-4 hrs. extn. of the clay with 30% H_2SO_4, which results in removal of Al, Mg, and Fe cations, without changing the specific surface area (87 sq. m./g.), followed by washing, drying, and outgassing, prevent the appearance of the coloring with Ph_2NH. The blue color is also obtained with dehydrated $CuSO_4$ and with Cr_2O_3 powder, not with Al_2O_3, MgO, ZnO, TiO_2, SiO_2, Bi_2O_3, $AlPO_4$, $Al_2(SO_4)_3$, $BaSO_4$, FeC_2O_4, ZnS, and Na_3AlF_6. A yellow color is produced on a vacuum-evapd. film of $BiCl_3$, none on similar films of TlCl, $PbCl_2$, $AlCl_3$, $ZnCl_2$, $SbCl_3$, NaI, TlI, and AgCl. Passage of dry NH_3 destroys the color in all cases; passage of air reinforces it somewhat on bentonite and on Cr_2O_3. The absorption spectrum of the blue-colored powder shows 2 maxima at 675 and at 800 mμ, the 1st of which is very close to the 680-mμ absorption max. of the mol. ion (semiquinone) $(Ph_2\ddot{N}H)^+$ formed by the loss of one of the 2 nonbonded electrons of the N atoms in the neutral $Ph_2\ddot{N}H$. This proves that the blue color is due to that ion, and not to the stable dye produced by the reaction of 2 or more mols. of the semiquinone. That dye, produced by oxidation of Ph_2NH in $HNO_3 + H_2SO_4$, has ε max. of absorption in the range between 600 and 500 mμ, depending on the acidity of the medium, but always definitely beyond the 680-mμ absorption max. of the simple semiquinone ion. Nor can the max. at 800 mμ be attributed to the stable dye; it may possibly be due to neutral mols. of Ph_2NH, deformed through activated adsorption. A

over

3rd max., below 400 mμ, corresponds to the expected shift
to longer waves of the normal absorption spectrum of
Ph_2NH as a result of phys. adsorption. The film adsorbed
on $BiCl_3$ has also a max. at around 650 mμ, and not in the
range 800-900 mμ characteristic of the product of deep
oxidation. The energy required to stabilize the semi-
quinone ion, estd. to be 7 e.v., is assumed to be supplied by
fixation of the electron by Fe^{+++}, Al^{+++}, or Mg^{++} ions
of the bentonite. The yellow color observed in adsorp-
tion on $BiCl_3$ may be due to $BiCl_3$, known to form yellow
or brown mol. compds. with aromatic mols. The yellow
film of Ph_2NH on $BiCl_3$ has an absorption max. at 420-30
mμ, which can be interpreted by energy resonance be-
tween Ph_2NH^+ and $BiCl_3$ on account of the closeness of
their absorption spectra, and the resulting shift to longer
waves. A similar resonance effect underlies the yellow
coloring of solns. of Ph_2NH in liquid SO_2 and of films of
gaseous SO_2 adsorbed on solid Ph_2NH at −80°. N. T.

TERENIN, A. N., ACAD

USSR/ Physics - Semiconductors
Photoeffect

Jan 50

"Accumulation of a Semiconductor's Electrons on Organic Dyes Adsorbed in It," Ye K. Putseyko, Acad A. N. Terenin, 4 pp

"Dok Ak Nauk SSSR" Vol LXX, No 3

Special study of thallium halides showed relation between internal photoeffect and photoeffect caused by absorption of light by a dye. This intensification of sensitized photoelectric sensitivity because of internal photosensitivity shows electrons liberated may, before their return to initial state, accumulate at intermediate levels of "adhesion," form which they are drawn out by action of light quanta absorbed by absorbed dye molec les. Submitted 22 Nov 49

PA 158T90

C.a.
1951

5

Photoreaction of pyridine in the adsorbed state. O. V. Fialkovskaya and A. N. Terenin (A. A. Zhdanov State Univ., Leningrad). *Izvest. Akad. Nauk S.S.S.R., Otdel. Khim. Nauk* **1951**, 226-41; cf. *C.A.* **44**, 6721*h*, 7147*f*.—Pyridine adsorbed from the vapor *in vacuo* on dry outgassed granular silica gel, in an amt. well below that corresponding to complete coverage much less capillary condensation, exposed 2 hrs. to a Zn spark rich in ultraviolet 3000-2000 A., showed no visible changes. On a plate of vitreous silica aerogel, 2 hrs.' exposure of the pyridine adsorbate produced a light-brown spot, which did not disappear on heating to 200° *in vacuo*. As the aerogel could not be heated above 150°, it is legitimate to assume that it did contain traces of O_2 and H_2O, and that the colored product formed under these conditions was identical with Freytag's (*C.A.* **27**, 724; **32**, 2839^4) "photopyridine" (I) characterized by an absorption in the range 4000-3000 A. with max. at 3500 A. A different colored product is formed when pyridine is illuminated while adsorbed on silica gel contg. Tl^+ ions, introduced by impregnating the silica gel with an ammoniacal soln. of TlCl (4-10% TlCl with respect to the silica); actual penetration of the Tl^+ ions into the lattice of the silica gel (in addn. to inclusions of TlCl microcrystals, evidenced by x-rays) is demonstrated by the bright-blue fluorescence of the system in excitation with the Zn spark. Two hrs.' exposure of the SiO_2-TlCl system alone to a Zn spark produced no visible changes. However, with pyridine vapor adsorbed prior to the exposure, a yellow spot appeared after 10-min. illumination and became very bright after 1 hr. The color disappears on mild warming with air of about 50°, but reappears with the original intensity on repeated illumination of the same spot. The same effects are observed with α-picoline, with the color appearing 2-4 times as fast as with pyridine. This yellow photoproduct (II) is formed in the absence of either O_2 or H_2O, and has a max. of absorption at 4250 A.; consequently, it is different from I. The yellow color II was obtained also, within 30 min., on illumination of an adsorbate of pyridine on a prepn. made by mixing still-hot silica gel (previously heated to 800°) with TlCl (1 TlCl:10 SiO_2 gel by wt.), and heating 4 hrs. to 300°, a method ensuring complete outgassing. The different natures of II and I follow also from the fact that II can be obtained only in the presence of TlCl. The yellow II is produced only on illumination with wave lengths shorter than 2550 A. That wave length corresponds to the max. of absorption of pyridine in C_6H_{14} soln. but also to max. absorption of thin layers of TlCl. That the photoreaction is detd. by absorption of light by pyridine only, and not by TlCl, is proved by the observation of the same threshold wave length with other Tl salts, with absorption spectra different from TlCl, namely Tl_2SO_4, $TlNO_3$, and $TlClO_4$, the latter being transparent in that wave-length range. Consequently, the photoreaction producing II is due to absorption of light by pyridine, and requires the presence of Tl^+ ions, no matter in what form they are introduced. The photoreaction still takes place if TlCl is strongly dild. by KCl, e.g. when the silica gel is mixed with a sublimate-phosphor KCl + 0.05% TlCl. On the other hand, there is no photoreaction with pyridine adsorbed on sublimed films of TlCl, not supported on silica gel; consequently, the reaction hinges on the presence of Tl^+ ions distributed in the silica gel. The photoreaction was further observed, in the same spectral region, also with silica gel impregnated with ammoniacal solns. of $PbCl_2$, $CdCl_2$, and AgCl, which do not absorb in that region; to obtain the same d. of color, it was necessary to expose with $PbCl_2$ 4 times, and with $CdCl_2$ 10 times as long as with TlCl. With AgCl, blackening precedes the appearance of II, but remains const. after a while, whereas the intensity of the yellow color increases;

evidently, pptn. of metallic Ag takes place in the few individual microcrystals of AgCl, whereas the photoreaction which produces II occurs in some Ag^+ centres which give rise to no blackening. Adsorbates of pyridine on films of $ZnCl_2$ and $SnCl_2$ on quartz gave no photoreaction, nor was a reaction observed with KCl, CsCl, $BiCl_3$, and $AlCl_3$. No reaction was found with adsorbates of pyridine on powders of MgO, TiO_2, ZnO, and PbO; the latter, evapd. *in vacuo*, had a yellow color of its own which disappeared after illumination of the pyridine adsorbate. That Cl has no part in the production of II is shown by the absence of an effect (other than darkening as a result of dissocn.) with a $HgCl_2$ film, in contrast to the weakly pos. reaction found on illumination of an adsorbate of pyridine on silica gel + Hg^{++}. Finally, illumination of the pyridine adsorbate on silica gel + AgCl with blue (instead of ultraviolet) light, while it did result in blackening (as in the absence of pyridine), gave no photoreaction II. The kinetic order of the photoreaction was estd. in the following way. With the same amt. of silica gel + TlCl, and with the amt. of pyridine admitted varied from 1 to 15, the time necessary to produce a spot of the same brightness varied from 90 to 6 min. Consequently, the product of time and concn. is approx. const., and the process is unimol., i.e. does not require the participation of a 2nd mol. of pyridine. The min. amt. of pyridine necessary for the appearance of II corresponds to coverage of about 0.1 sq. m. out of a sp. surface area of 300 sq. m./g.; this proves that the photoreaction involves only pyridine mols. adsorbed at the surface. Cooling to −180° of an adsorbate illuminated at room temp. resulted only in some weakening of the coloring effect, but not in its disappearance. Admission of gaseous NH_3 under 10 mm. resulted in immediate disappearance of the color; admission of air at room temp. had no effect. The phenomenon of production of II consists evidently in a photoionization of the pyridine and transfer of the electron to the Tl^+ (or other metal ion), which acts as electron acceptor and thus stabilizes the pos. pyridine ion II. In that respect, the phenomenon is analogous to the transfer of an electron from the hydrate H_2O to the metal ion in the far-ultraviolet absorption of aq. salt solns. This view is borne out by the agreement of the observed order of effectiveness of the metal cations in the photoreaction II, and their order with respect to the position of the max. of far-ultraviolet absorption of their aq. solns.: Tl^+ 214, Ag^+ 210.5, Pb^{++} 208.5, Cd^{++} < 180 mμ. It is further borne out by the observed ready occurrence of the photoreaction II on an adsorbate of pyridine on CeO_2 (powder) which is a very effective electron acceptor, as well as on silica gel impregnated with CeO_2. Freytag's (*loc. cit.*) interpretation of the nature of I as a product of hydrolysis of pyridine, or its interpretation by Feigl and Anger (C.A. 28, 2334^9) as the NH_4 salt of that product, fails to account either for the necessity of the presence of O, or for the reversibility of the reaction. It appears plausible that I and II have a common origin, with the primary reaction consisting in both instances in the formation of a pos. pyridine ion. In the case of I, O_2 plays the role of the necessary electron acceptor. This primary reaction is followed and is complicated by partial reactions of oxidation and hydrolysis.

N. Thon

TERENIN, A. N.

"Interaction of Formamide with Carbonyl-Containing Compound in the Presence of a Nickel Catalyst," Iz. Ak. Nauk SSSR, Otdel. Khim. Nauk, No. 2, 1951

CA

Sensitized fluorescence in vapors of organic compounds. A. N. Terenin and A. V. Karyakin. *Izvest. Akad. Nauk S.S.S.R., Ser. Fiz.* 15, 680-5(1951).—A mixt. of naphthalene and acridine vapor was examd. The lines emitted by a Mg spark (2783-2790 A.) correspond to an absorption band of naphthalene (2784 A.) and to a min. in the absorption of acridine. Thus the violet fluorescence of pure acridine vapor does not appear upon excitation with a Mg spark at pressures of 5-100 mm. (160-250°). However, when a beam of naphthalene vapor of 0.1-mm. pressure and higher is injected into acridine vapor of 60 mm. pressure and up, fluorescence appears along the naphthalene beam, particularly strong at 200 mm. acridine (300°) and 4-10 mm. naphthalene (75-90°) pressure. O quenches naphthalene but does not quench acridine fluorescence; however, in case of mixt., the sensitized fluorescence of acridine is quenched by O.

S. Pakswer

TRANSLATION AVAILABLE IN LIBRARY.

180T93

USSR/Physics - Fluorescence

Feb 51

"Effect of Water Adsorption on Extinction of Fluorescence of Adsorbers," A. N. Terenin, A. V. Kariakin

"Zhur Eksper i Teoret Fiz" Vol XXI, No 2, pp 107-113

Examd effect of temp on extinction of fluorescence of adsorbing anthraquinone on silica gel in vacuum by gaseous oxygen. Found exceptionally strong extinction in case of oxygen adsorption caused by deep freezing of adsorber. Established that preliminary adsorption of aqueous vapor has essential effect on behavior and efficiency of extinction of adsorber by gaseous oxygen.

LC

180T93

TERENIN, A. N.

A. N. Terenin, acad., and P. P. Feofilov. The greatest Soviet scientist-optician. (refers to S. I. Vavilov) P. 111.

SO: Vestnik, Messenger of the Acad. of Sci., USSR. 21, 3, (1951)

TERENIN, A. N.

Transfer and migration of energy in biochemical processes. I. A. N. Terenin. *Uspekhi Fiz. Nauk* 43, 347-79(1951).—Review of developments in these fields: concn. effects in solns. of pigments; theory of transfer of energy of activation; electronic migration of energy of activation in mol. crystals; sensitization of the fluorescence of pigments in soln.; transfer of activation energy of chlorophyll in photosynthesis; transfer of energy from leaf pigments to chlorophyll. 30 references. J. P. Danehy

TERENIN, A. N.

USSR/Chemistry - Photosynthesis Nov 51

"Photoelectrochemical Effect of Phthalocyanines, Chlorophyll, and Pheophytin," V. B. Yevstigneyev, Acad A. N. Terenin, Lab of Photobiochem, Inst of Biochem imeni A. N. Bakh, Acad Sci USSR

"Dok Ak Nauk SSSR" Vol LXXXI, No 2, pp 223-226

Using special cell described in text, measured photo-potentials of phthalocyanines, chlorophyll [I], and pheophytin [II]. Using double layers of the pigments with opposite sign of potential, established that photoelectrochem effect is due to interaction between pigment film and electrolyte soln. Effect of different wave lengths varies with

199T7

USSR/Chemistry - Photosynthesis (Contd) Nov 51

intensities of absorption by pigment. Potential changes with redox action of electrolyte and substances dissolved in it. Investigated action of O_2, quinone, hydroquinone, ascorbic acid, hydrosulfite, and sulfite. Electrochem behavior of I and II under the same conditions differs in a manner which confirms data on the easier photoreducibility and more difficult photooxidability of II as compared with I, indicating possible participation of Mg atom in these processes.

199T7

TERENIN, A.N.

4

7495 TT-540

SENSITIZED PHOSPHORESCENCE OF ORGANIC MOLECULES AT LOW TEMPERATURES (Sensibilizovannaia Fosforestsentsiia Organicheskikh Molekul Pri Nizkoi Temperature) V. I. Ermolaev and A. N. Terenin. Translated by G. Belkov from Akad. Nauk S.S.S.R., Pamyati S. I. Vavilova, 1952, 46(1952) 16p

An attempt to find proof of the transfer of excitation energy in concentrated solutions by energy transfer from one molecule to another is made by observation of secondary luminescence of molecules of another type in a mixture where the primary excited fluorescent molecules undergo fluorescence quenching. In particular, sensitized fluorescence of mixtures and solutions of fluorescent aromatic molecules is studied. Benzaldehyde molecules were chosen as one of the participants in energy transfer. Sensitized phosphorescence was found in napthalene + benzaldehyde. Similar effects were observed in an ethanol solution and in other pairs of substances. (B.J.H.)

①

TERENIN, A.N.

Molecules

Priority of Soviet science in the treatment of a prolonged state of excitation of organic molecules. Biokhimia, 17, no. 1, 1952.

9. Monthly List of Russian Accessions, Library of Congress, JUN. 1952 [illegible], Uncl.

235T92

USSR/Physics - Phosphorescence Sensitization 21 Jul 52

"Sensitization of Phosphorescence of Organic Molecules at Low Temperatures: Intermolecular Transfer of Energy With Excitation of the Triplet Level," Acad A. N. Terenin, V. L. Yermolayev

"Dok Ak Nauk SSSR" Vol 85, No 3, pp 547-550

Discusses investigations devoted to the problem of transfer of excitation energy in solns of mixts of fluorescing aromatic mols at temp of liquid air, for the purpose of establishing the phenomenon of sensitization of excitation by one compd of the

235T92

phosphorescence spectrum of another compd, denoted by A+B. Gives tables and graphs of intensity of sensitized phosphorescence of various compds in dependence on concn of another. Submitted 3 May 52.

235T92

TERENIN, A. N. [illegible]

USSR/Chemistry - Electrochemistry, Photoelectric Effects

"Photoluminescence of ZnO on Electrodes in Solutions of Electrolytes,"

Acad A. N. Terenin and D. G. Bonezhkin, Sci-Res Phys Inst, Leningrad State U im A. A. Zhdanov

DAN SSSR, Vol 88, No 1, pp 99-102

When a potential of 1 v is applied to a Ni or Pt electrode covered with a thin layer of ZnO and immersed in a soln of electrolyte (0.1N), a reversible change in the photoluminescence of the layer is observed. The anode darkens and the cathode brightens. This phenomenon was studied with various electrolytes and it was observed that changes in the fluorescence of the ZnO not only reflect the state of polarization of the Pt electrode, but also reveal the photoelectric and electrochemical processes taking place on it.

262T5

IUSTOVA, Ie.N.; TERENIN, A.N., akademik.

Colorimetric method for setting up tables for the detection of color blindness. Dokl.AN SSSR 90 no.4:533-535 Je '53. (MLRA 6:5)

1. Akademiya Nauk SSSR (for Terenin). (Color blindness)

NESTEROVSKAYA, Ye.A.; TERENIN, A.N., akademik.

Discoloration of photochemically colored silver halide. Dokl.AN SSSR 90 no.4:587-590 Je '53. (MLRA 6:5)

1. Akademiya Nauk SSSR (for Terenin). 2. Nauchno-issledovatel'skiy institut fiziki Odesskogo gosudarstvennogo universiteta im. I.I. Mechnikova (for Nesterovskaya). (Photochemistry) (Silver halide)

DEMKINA, L.I.; TERENIN, A.N., akademik.

Circulation in the vitreous body of the eye. Dokl.AN SSSR 90 no.5:765-766 Je '53.
(MLRA 6:5)

1. Akademiya nauk SSSR (for Terenin). (Vitreous humor)

ANDREYEV, S.N.; KHALDIN, V.G.; TERENIN, A.N.' akademik.

Development of trans-influence in absorption spectra of Pt (IV) complex compounds of the chloramine series. Dokl.AN SSSR 90 no.5:787-790 Je '53. (MLRA 6:5)

1. Leningradskiy gosudarstvennyy universitet im. A.A. Zhdanova (for Andreyev, Khaldin). 2. Akademiya nauk SSSR (for Terenin). (Absorption spectra) (Platinum organic compounds)

SHMULYAKOVSKIY, Ya.E.; ALEKSANDROV, S.N.; TERENIN, A.N., akademik.

Complex emission spectra of 2-methyl-2-vinyl- and 2-methyl-2-ethyl-cyclopropanecarbonic esters. Dokl.AN SSSR 90 no.5:827-828a Je '53. (MLRA 6:5)

1. Akademiya nuak SSSR (for Terenin). (Spectrum analysis) (Esters)

TERENIN, A. N.

USSR/Physics - Semiconductor Sensitization 21 Jun 53

"Sensitization of Internal Photoeffect of Semiconductors by Chlorophyll and Related Pigments," Ye. K. Putseyko and Acad A. N. Terenin

DAN SSSR, Vol 90, No 6, pp 1005-1008

Continue their previous investigations on additional maxima in visible spectrum (cf. ZhFKh 23 (1949); DAN 70 (1950)) by experimenting with sensitization by means of phthalocyanin (with Mg, Cu or without metal), hemin, hematin and others having strong effect on photobiochemical processes. Results are presented in graphs. Rec 25 Apr 53.

269T99

SHAMOVSKIY, L.M.; RYBAKOVA, L.I.; GOSTEVA, M.I.; TERENIN, A.N., akademik.

Mechanism of the additive coloration of alkaline haloid crystals. Dokl. AN SSSR 91 no.1:67-70 Jl '53. (MLRA 6:6)

1. Akademiya nauk SSSR (fe. Terenin). 2. Vsesoyuznyy nauchno-issledovatel'skiy institut mineral'nogo syr'ya. (Crystallography)

VARSHAVER, B.G.; TITOV, A.A.; TERENIN, A.N., akademik.

Some similarities and differences of processes occuring during photolysis and second maturation of photographic emulsions. Dokl. AN SSSR 91 no.1: 111-114 Jl '53. (MLRA 6:6)

1. Vsesoyuznyy nauchno-issledovatel'skiy kinofotoinstitut. 2. Akademiya nauk SSSR (for Terenin). (Photographic emulsions)

MOSHKOVSKIY, Yu.Sh.; KARPOVA, A.L.; TERENIN, A.N., akademik.

Effect of gelatin on thermal fixation of tricarbocyanine dyes and the chemical nature of component-accelerators in gelatin. Dokl. AN SSSR 91 no.2:299-300 Jl '53.
(MLRA 6:6)

1. Vsesoyuznyy nauchno-issledovatel'skiy kinofotoinstitut. 2. Akademiya nauk SSSR (for Terenin). (Dyes and dying--Chemistry) (Gelatin)

GUMENYUK, A.G.; TERENIN, A.N., akademik.

Effect of temperature on the light absorption of thin and superthin layers of silver. Dokl.AN SSSR 91 no.4:783-786 Ag '53. (MLRA 6:8)

1. Akademiya nauk SSSR (for Terenin). 2. Odesskiy gosudarstvennyy universitet im. I.I.Mechnikova (for Gumenyuk).
(Absorption of light) (Silver)

EVSTIGNEYEV, V.B.; GAVRILOVA, V.A.; TERENIN, A.N., akademik.

Spectral properties of the reduced forms of chlorophylls a and b.
Dokl.AN SSSR 91 no.4:899-902 Ag '53. (MLRA 6:8)

1. Akademiya nauk SSSR (for Terenin).
(Chlorophyll)
(CA 48 no.2:447 '54)

SHESTAKOV, V.M.; TERENIN, A.N., akademik.

Investigation of the internal kinematics of irregular filtrated flows and the solution of the equation of irregular filtration. Dokl.AN SSSR 91 no.5: 1047-1050 Ag '53.
(MLRA 6:8)

1. Akademiya nauk SSSR (for Terenin).
(Percolation)

ARKHANGEL'SKAYA, V.A.; FEOFILOV, P.P.; TERENIN, A.N., akademik.

Kinetics of the luminescence of silver haloid salts. Dokl.AN SSSR 91 no.5: 1055-1058 Ag '53. (MLRA 6:8)

1. Akademiya nauk SSSR (for Terenin). (Silver salts) (Luminescence)

MOCHALOV, K.N.; RAFF, E.L.; TERENIN, A.N., akademik.

Redistribution of the intensity of spectral lines of elements in discharge through argon. Dokl.AN SSSR 91 no.5:1067-1070 Ag '53. (MLRA 6:8)

1. Akademiya nauk SSSR (for Terenin). 2. Kazanskiy khimiko-tekhnologicheskiy institut im.S.M.Kirova.
(Spectrum analysis) (Electric discharges through gases) (Argon)

USSR/Physics - Photoeffect of ZnO 11 Aug 53

"Effect of Adsorption of Gases and Vapors on the Intrinsic Photoeffect of Zinc Oxide and That Sensitized by Chlorophyll and its Analogs," Ye. K. Putseyko

DAN SSSR, Vol 91, No 5, pp 1071-1074

The sensitization of the photoeffect of ZnO to visible light by addition of chlorophyll or similar pigments found by author with cooperation of A. N. Terenin (DAN SSSR, 90, 6 (1953)) led to

266T105

further studies of effect of gases. Results are presented in graphs. Presented by Acad A. N. Terenin 16 Jun 53.

BULANOVA, K.N.; TERENIN, A.N., akademik.

Spectral sensitivity of the central part of the retina. Dokl.AN SSSR 91 no.6:1333-1336 Ag '53. (MLRA 6:8)

1. Akademiya nauk SSSR (for Terenin). (Retina) (Optics, Physiological)

RAUTIAN, G.N.; TERENIN, A.N., akademik.

Color adaptation and color distinction thresholds. Dokl.AN SSSR 92 no.2:297-299 S '53. (MLRA 6:9)

1. Akademiya nauk SSSR (for Terenin). (Color sense)

YEVSTIGNEYEV, V.B.; GAVRILOVA, V.A.; TERENIN, A.N., akademik.

Oxidation-reduction potential of the photoreduced form of chlorophyll. Dokl. AN SSSR 92 no.2:381-384 S '53. (MLRA 6:9)

1. Akademiya nauk SSSR (for Terenin). 2. Laboratoriya fotobiokhimii Instituta biokhimii im. A.N.Bakha Akademii nauk SSSR (for Yevstigneyev and Gavrilova).
(Chlorophyll) (Oxydation-reduction reaction)

FEOFILOV, P.P.; TERENIN, A.N., akademik.

Polarized luminescence of the F-centers in CaF_2. Dokl.AN SSSR 92 no.3:545-548 S '53. (MLRA 6:9)

1. Akademiya nauk SSSR (for Terenin).
(Crystallography) (Luminescence) (Polarization (Light))

SHATALOV, A.A.; TERENIN, A.N., akademik.

Photochemical transmutation of the F-centers in KCl crystals at high temperatures. Dokl.AN SSSR 92 no.3:549-552 S '53. (MLRA 6:9)

1. Akademiya nauk SSSR (for Terenin). 2. Kievskiy gosudarstvennyy universitet im. T.G.Shevchenko (for Shatalov).
(Photochemistry) (Potassium chloride) (Absorption spectra)

ZHDANOV, S.P.; TERENIN, A.N., akademik.

Structure of borosilicate glasses. Dokl.AN SSSR 92 no.3:597-600 S '53.
(MLRA 6:9)

1. Akademiya nauk SSSR (for Terenin). (Glass manufacture--Chemistry)

FEOFILOV, P.P.; TERENIN, A.N., akademik.

Polarization of the F-center luminescence in the crystals of alkaline and haloid salts. Dokl.AN SSSR 92 no.4:743-746 O '53. (MLRA 6:9)

1. Akademiya nauk SSSR (for Terenin).
(Luminescence) (Polarization (light)) (Crystallography)

KRASNOVSKIY, A.A.; KOSOBUTSKAYA, L.M.; VOYNOVSKAYA, K.K.; TERENIN, A.N., akademik.

Active and inactive forms of protochlorophyll, chlorophyll, and bacterial chlorophyll in photosynthesizing organisms. Dokl.AN SSSR 92 no.6:1201-1204 O '53. (MLRA 6:10)

1. Akademiya nauk SSSR (for Terenin). (Chlorophyll) (Photosynthesis)

BULANOVA, K.N.; TERENIN, A.N., akademik.

Light threshold in the foveal section of the retina. Dokl.AN SSSR 93 no.1: 29-30 N '53. (MLRA 6:10)

1. Akademiya nauk SSSR (for Terenin). (Retina) (Optics, Physiological)

PINEGIN, N.I.; TERENIN, A.N., akademik.

Quantum characteristics of daylight vision. Dokl.AN SSSR 93 no.1:31-34 N '53. (MLRA 6:10)

1. Akademiya nauk SSSR (for Terenin). (Sight)

DOMAN, N.G.; TERENIN. A.N., akademik.

Secretion of primary products in photosynthesis. Dokl.AN SSSR 93 no.1:115-117 N '53.
(MLRA 6:10)

1. Akademiya nauk SSSR (for Terenin). 2. Institut biokhimii im. A.N.Bakha Akademii nauk SSSR (for Doman).
(Photosynthesis)

TERENIN, A.N., akademik; KONDRAT'YEV, V.N., akademik; KNUNYANTS, I.L., akademik; KABACHNIK, M.I.; SOKOLOV, N.D., doktor fiz.-mat. nauk; REUTOV, O.A., doktor khimicheskikh nauk; MOSKVICHEVA, N.I., tekhnicheskiy redaktor

[Status of the theory of chemical structure in organic chemistry] Sostoianie teorii khimicheskogo stroeniia v organicheskoi khimii. Moskva, Izd-vo Akademii nauk SSSR, 1954. 122 p. [Microfilm]
(MLRA 7:10)

1. Chlen-korrespondent AN SSSR (for Kabachnik) 2. Akademiya nauk SSSR. Otdeleniye khimicheskikh nauk
(Chemical structure) (Chemistry, Organic)

USSR/Physics

Card 1/1

Author : Terenin, A. N., Academician; and Karyskin, A. V.

Title : Transfer of energy during sensitized fluorescence of vapor mixtures of organic compounds

Periodical : Dokl. AN SSSR, 96, Ed. 2, 269 - 272, May 1954

Abstract : The greater intensity of naphthalin-sensitized fluorescence of vapors of complex organic compounds having very low concentration in vapors, brings up the problem about the participation of long-life photoactivated naphthalin molecules in a triplet electron state during the process of energy transfer. The possibility of such a process has acquired a certain conclusiveness in connection with a recently revealed similar process of energy transfer in frozen solutions. Ten references; 9 USSR since 1935. Graphs.

Institution : ......

Submitted : March 19, 1954

[illegible]

USSR/Chemistry - Physical chemistry

Card : 1/1

Authors : Kryakin, A. V. and Terenin, A. N.

Title : Effect of oxygen condensation on the flourescence and absorption spectrum of anthraquinone derivatives in adsorbed state.

Periodical : Dokl. AN SSSR, 97, Ed. 3, 479 - 482, July 21, 1954

Abstract : The oxygen extinction of the fluorescence of anthraquinone derivatives in gaseous and adsorbed states was investigated to determine the initial stages of oxygen addition and its reactions with molecules of the numerous $C_{14}H_8O_2$-derivatives. It was established that $C_{14}H_8O_2$ derivatives have a sharply expressed selectivity for the extinction of fluorescence with gaseous oxygen, depending upon the position of the substitute. The absence of fluorescence extinction with oxygen was attributed to the intramolecular H-bond when the O_2 molecule does not affect H in the OH and NH_2 groups but the carbonyl anthraquinone group and its derivatives. Five USSR and 1-German references. Graphs.

Institution : ...

Submitted : May 20, 1954

TERENIN, A. N., Academician

"Intermolecular Transfer of Excitation Energy" a paper presented at the Conference on Molecular Luminescence and Luminescent Analysis, MINSK from 20 to 25 June 1955.

Terenin, A.N.

AF701597 TREASURE ISLAND BOOK REVIEW AID 793 - S

A. N. TERENIN

VYDELENIYE ADSORBIROVANNYKH GAZOV S METALLOV I POLUPROVODNIKOV I IKH ADSORBTSIYA POD DEYSTVIYEM SVETA (Desorption of gases from metals and semiconductors and their adsorption under the action of light) In Problemy kinetiki i kataliza (Problems of Kinetics and Catalysis), vol. 8. Izdatel'stvo Akademii Nauk SSSR, 1955. Section I: Effect of illumination on the adsorbability of solids. p. 17-33.

A description is given of processes occuring under the action of light, namely, photodesorption, photosorption, photochemical dissociation of gas molecules adsorbed by a solid, and photochemical dissociation of adsorbents (semiconductors: oxides and halides of heavy metals). The photodesorption of CO from nickel powder and from $NiSO_4$ and the photodesorption of oxygen from zinc oxide are illustrated by diagrams. The photodesorption of CO from nickel powder is illustrated in Fig. 1 (21); the photodesorption of oxygen from ZnO in Fig. 4 (p. 23). No photosorption on metals has been observed. Experiments carried out with AgI, TlCl, and ZnO did not give definite results. Nine diagrams, 31 references, 16 Russian (1928-1953).

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[illegible]

AF701597 TREASURE ISLAND BOOK REVIEW AID 797 - S

TERENIN, A. N., and PUTSEYKO, YE. K.

VLIYANIYE GAZOV I PAROV NA FOTOELEKTRICHESKIYE PROTSESSY V OKISI TSINKA I V DRUGIKH POLUPROVODNIKAKH (Effect of gases and vapors on photoelectric processes occuring in zinc oxide and in othe semiconductors). In Problemy kinetiki i kataliza (Problems of Kinetics and Catalysis), vol. [illegible] Izdatel'stvo Akademii Nauk SSSR, 1955 Section I: Effect of illumination on the adsorbability of solids. p. 53-60.

The effect of gases -- oxygen, hydrogen, carbon dioxide -- and of vapors of water, ethyl alcohol, acetone, acetic acid, benzaldehyde, quinone, amonia, and methyldiphenylamine had been investigated. Some of the molecules are electron donors or electron acceptors. The voltage of freshly prepared pulverulent zonc oxide is markedly decreased by evacuation of air even at room temperature; however, the voltage is restored rather rapidly when air is let in. Oxygen (dry) intake restores the voltage only to 5-20% of its initial value. 5 references, 3 Russian (1936-1953). 6 diagrams.

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Terenin, A. N.

AF701597 TREASURE ISLAND BOOK REVIEW AID 805 - S

TERENIN, A. N. (Leningrad State University)
DISKUSSIYA (Discussion). In Problemy kinetiki i kataliza (Problems of Kinetics and Catalysis), vol. 8. Izdatel'stvo Akademii Nauk SSSR, 1955. Section I: Effect of illumination on the adsorbability of solids. p. 75-76.

Criticism of Voyevodskiy's interpretation and quantitative treatment of photodesorption observed on metals. The representation of metals as systems of conjugated bonds is too simplified. This conception is applicable to organic compounds, but not to metals. Examples are given to show the rupture of the double bond in organic substances and the increase in adsorption by saturation of formed free valences.

1/1

Terenin, A. N.

The nature of the photochemical action in the sensitized oxygen oxidation reactions and hydroperoxide break-down reactions. A. N. Terenin. *Voprosy Khim. Kinetiki, Kataliza i ~~Reaktsionnoi Sposobnosti~~*, Akad. Nauk S.S.S.R. 1955, 85-91 (in Russian).

W. M. Sternberg

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TERENIN, A.N.

USSR/Optics - Spectroscopy

K-6

Abs Jour : Referat Zhur - Fizika, No 3, 1957, 7899

Author : Terenin, A.N.

Inst :

Title : Properties of Surface Compounds Derived from Data of Optical Investigations.

Orig Pub : Geterogennyy kataliz v khim. prom-sti, M., Goskhimizdat, 1955, 179-193

Abstract : A survey of the author's work and that of his collaborators on the spectral detection of adsorbed molecules, on the study of the character of the interaction between the adsorbed molecules with the surface of a solid body by the infrared adsorption spectrum method, and on the investigation of the effect of adsorption of gases and vapors on surface photoelectric properties of oxide semiconductors.

Bibliography, 54 titles.

Card 1/1

- 85 -

USSR/ Scientific Organization - Conferences

Card 1/1 Pub. 124 - 11/40

Authors : Terenin, A. N., Academician

Title International conference on spectroscopy

Periodical : Vest. AN SSSR 1, 59-61, Jan 1955

Abstract : Notes are presented on the Fifth International Spectroscopic Conference held on Aug. 30 - Sept 3, 1954 in Gmunden, Austria under the auspices of the Austrian Chemical Society. The conference was attended by 540 delegates representing 24 nations (USA and USSR included). Of the 54 lectures given 30 were devoted to problems of emission spectral analysis of metals and non-metals according to atomic spectra. The remaining 24 lectures dealt in the field of molecular spectroscopy. Names of delegates are given.

Institution : .....

Submitted : .....

A-11-S-T

11185* Infra-Red Spectroscopy of Molecules Adsorbed on Porous Glass. Spectroscopie infrarouge des molécules adsorbées sur verre poreux. (French.) A. A. [illegible], N. G. Jaroslavsky, A. W. Karjakin, and A. I. Sidorova. Spectrochimica Acta, 1955, [illegible] 2-3, p. [illegible]

Spectral analysis of adsorbed [illegible] is reported. 4 ref.

TERENIN, A.N.; PUTSEYKO, Ye.K.

Dye sensitization of the internal photoeffect in semiconductors.
Usp.nauch.fot. 3:101-109 '55. (MIRA 9:1)
(Photographic emulsions)